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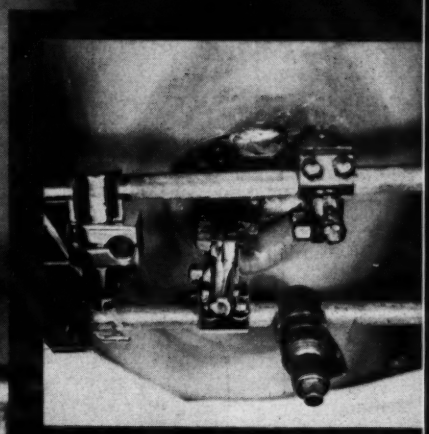

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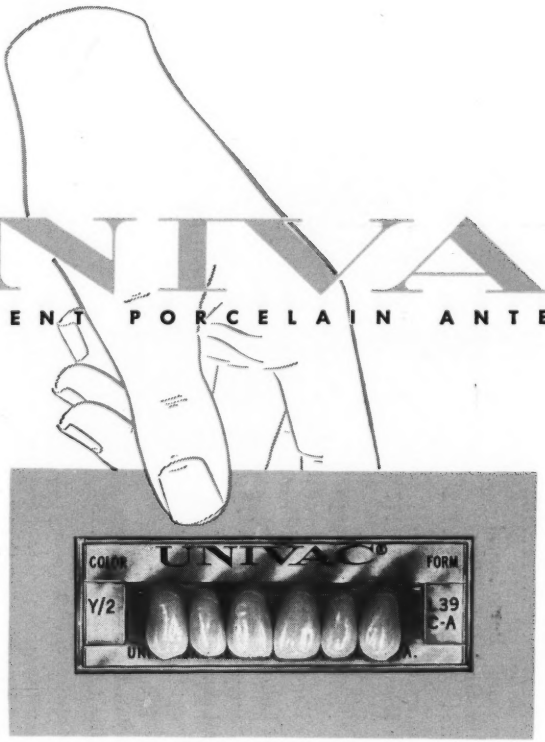

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The DYNAMICS *of* HIGH SPEED

for Full Coverage Preparations

MARTIN R. PROTELL, B.S., D.D.S., New York

DIGEST

In this article the dynamics of high speed are discussed, not in terms of revolutions per minute, but as a method designed to decrease the amount of chair time needed to prepare teeth for full coverage restorations. Step-by-step directions are presented for high speed procedures in various operative techniques.

Basic Factors

Experimentation has established the following tenets in the use of high speed techniques in operative procedures:

(1) For every hour spent in tooth preparation approximately five to eight minutes are needed for grinding operations.

(2) An increase in R.P.M. (over 50,000) will not appreciably reduce operating time.

Development of Skill and Efficiency—It is apparent that a reduction of preparation time will not be found in higher speeds (over 50,000 R.P.M.) but in more skillful techniques and greater efficiency in the use of carbide burs and diamond stones. 30,000 R.P.M. is the speed recommended at this time to be the least tension provoking, most efficient, and the most useful in conserving chair time.

Technical Requirements—Successful use of high speed is dependent upon the following factors:

(1) Efficiency of cutting tools (carbide burs, and diamond stones).

(2) Use of coolants.

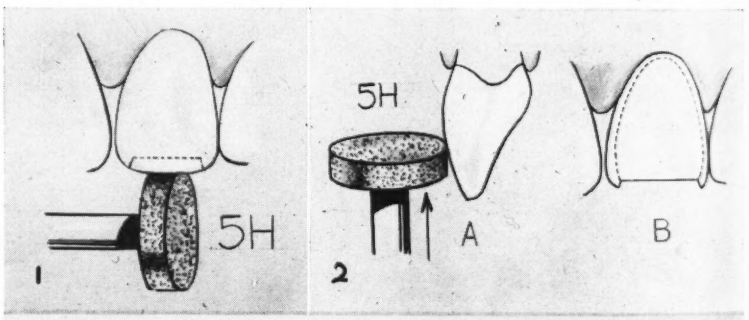
(3) Operation management (a systematic technique for preparations using fewer cutting tools and a minimal number of changes with handpiece instrumentaria).

Knowledge of Intermediate Speeds Recommended—Since high speed is not indicated for every operation in crown and bridge procedure its use must be judicious and deliberate. It is suggested that dentists using the conventional speed of 6,500 R.P.M. should not convert to high speeds without first acquainting themselves with the techniques of the intermediate speeds of 12,000 to 18,000 R.P.M.

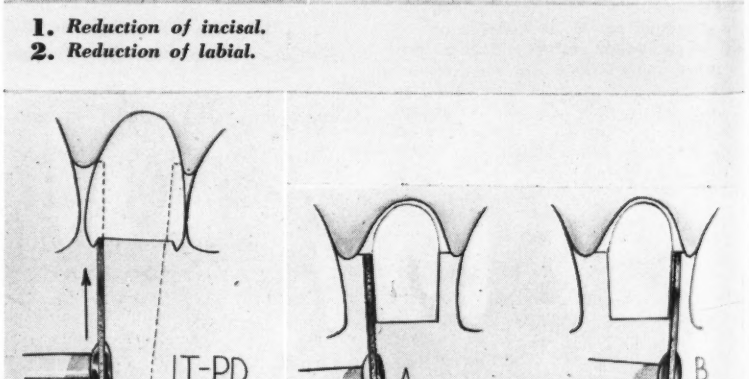
A Systematic Preparation Technique

The dentino-enamel junction is used as the guide for the reduction of tooth structure.

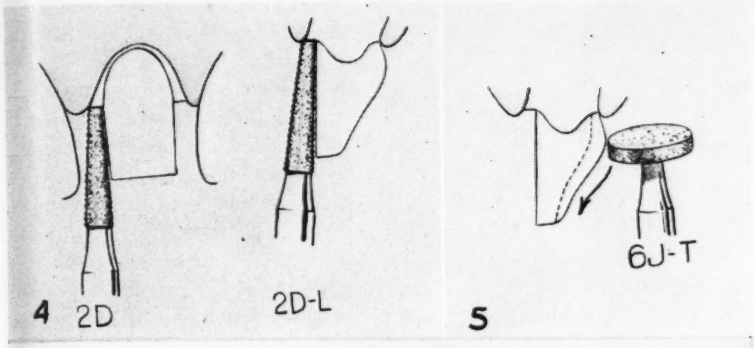
Anterior Teeth—For the preparation of anterior teeth, use a straight



1. ***Reduction of incisal.***
2. ***Reduction of labial.***



3. ***Reduction of proximal surfaces.***
3A. ***Extension of proximal slices onto labial and lingual surfaces.***



4. ***Joining of labial and interproximal shoulders.***
5. ***Reduction of labial.***

handpiece and direct vision, whenever possible.

Step 1, Reduction of Incisal Edge—Reduce the incisal edge to allow for sufficient body of jacket material to resist stresses and biting pressures, and clearance with opposing teeth. Establish incisal horns at the dentino-enamel junction (Fig. 1).

Step 2, Reduction of the Labial Surface—Using the same cutting instrument and with light, deft strokes, start preparation at the incisal and reduce the enamel toward the gingival. A shoulder is automatically formed and undercuts are avoided. Note the appearance of the dentino-enamel junction at the labial proximals. Figure 2 shows this step and the direction of the cutting stone.

Step 3, Reduction of Proximal Surfaces—Using the dentino-enamel line and the incisal horns as guides, reduce the proximal surfaces. This establishes the interproximal shoulder just below the crest of the interproximal gingival papilla. Either a double side or safe-side disc may be used (Fig. 3).

Step 4—With the same discs and after the slices are completed, extend the preparations onto the labial and lingual surfaces. The safe-side discs can be used to extend, without danger of abrasion, to adjacent teeth. The slice and the shoulder, as described, should then appear as they are shown in Figure 3A.

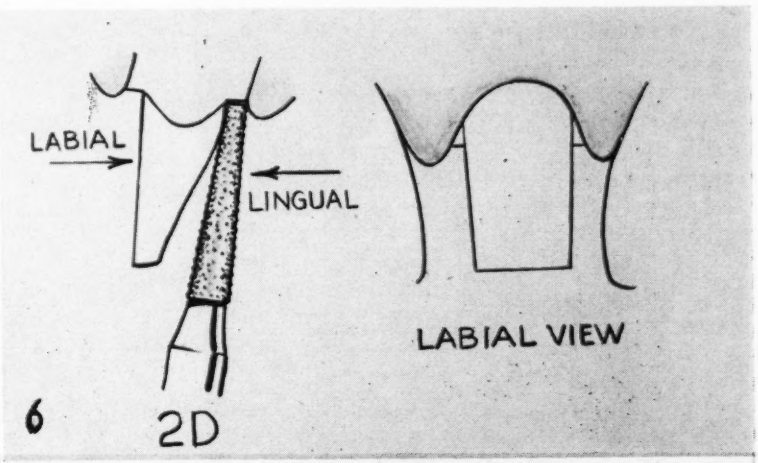
Step 5, Joining of Shoulders—Join the interproximal shoulders with the labial shoulder and extend the shoulders beyond the free margin of the gingiva. Hold the tip of the cutting tool at a right angle to the margin of the gingiva. This will ensure an even shoulder and a properly tapered tooth (Fig. 4).

Step 6, Reduction of Lingual Surface—Start the preparation at the gingival margin as shown in Figure 5 and reduce the tooth structure toward the incisal. Follow the contour of the dentino-enamel line, which at this time should be quite evident. Remove sufficient tooth structure to afford enough jacket material to resist pressures of mastication (Fig. 5).

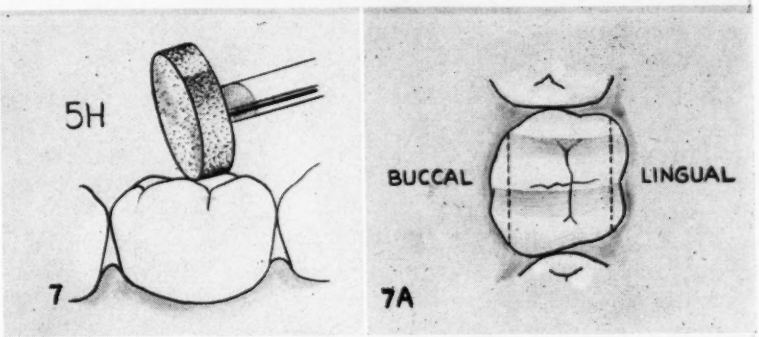
Step 7, All Shoulders Joined—With the tapering stone, join the lingual shoulder with the interproximal shoulders, following the same procedure as outlined in Step 5 (Fig. 6).

Step 8—With a rubber wheel, bevel sharp incisal line angles. Note that only four cutting instruments are used, necessitating but five changes in the handpiece.

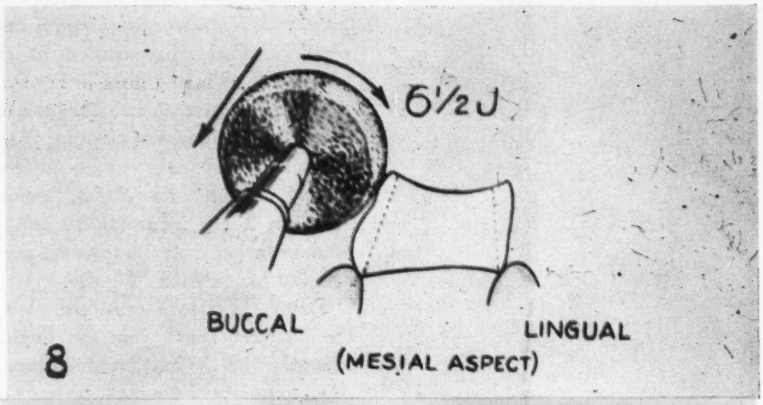
Posterior Teeth—In the preparation of posterior teeth, the dentino-enamel junction is used as one of the



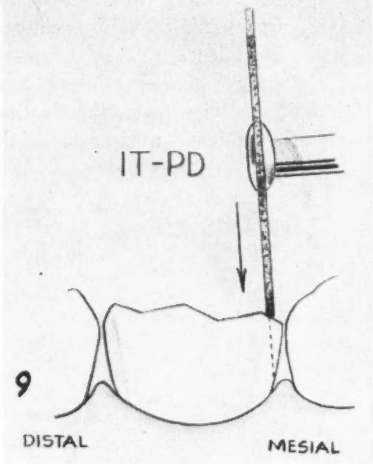
6. ***Lingual shoulders joined with interproximal shoulders.***

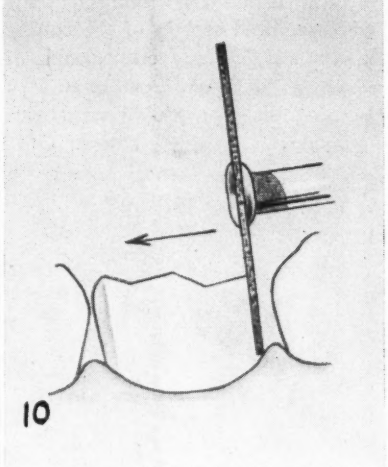


7. ***Reduction of occlusal surfaces.***
7A. ***Demonstration of dentinoenamel junction (occlusal view).***

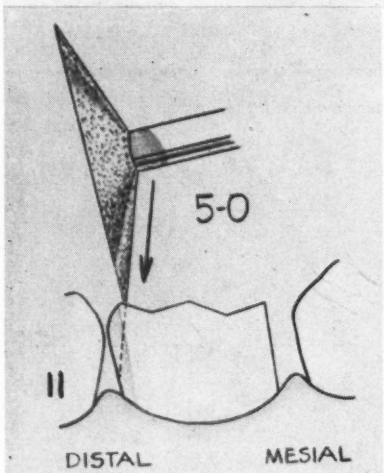


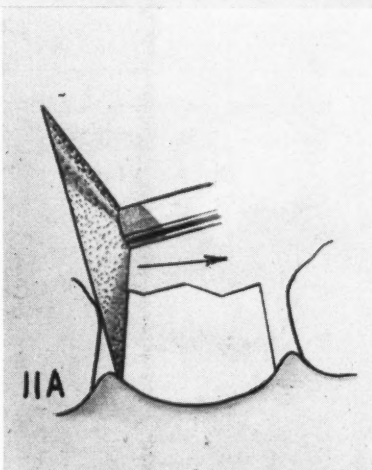
8. ***Reduction of buccal and lingual surfaces (partial).***





9. ***Reduction of mesial.***
10. ***Extension of mesial onto buccal and lingual surfaces.***





11. ***Reduction of distal.***
11A. ***Extension of distal onto buccal and lingual surfaces.***

main guides in the reduction of sufficient tooth structure. Whenever possible, it is recommended that full shoulder preparations be made.

Step 1, Reduction of Occlusal Surface—Denude all occlusal enamel to allow for sufficient bite clearance. Use as large a diamond stone as practical. With the reduction of the occlusal enamel the dentino-enamel junction should become evident as shown in Figures 7 and 7A.

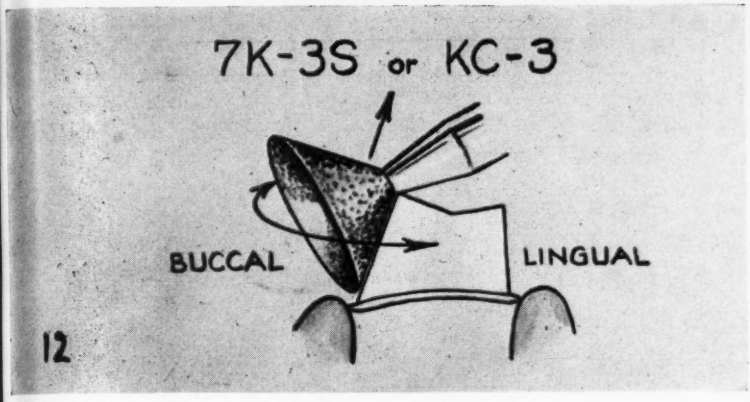
Step 2, Partial Reduction of Buccal and Lingual Surfaces—Using the straight handpiece for Steps 1, and 2, start reducing buccal and lingual areas from the occlusal to the gingival margin. This will establish a shoulder both buccally and lingually and help contour these surfaces toward the occlusal as shown in Figure 8. The removal of the buccal and lingual enamel will demonstrate the dentino-enamel junction.

Step 3A, Reduction of Proximal Surfaces (Mesial)—Start the proximal slice at the occlusal dentino-enamel junction and follow this line to the interproximal gingival papilla. A double-surfaced or safe-side disc may be used (Fig. 9).

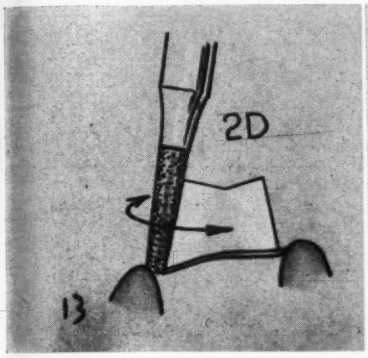
Step 3B, Extension of Mesial Proximal Surface—Use an outside cut (safe-side) disc for extension of mesial proximal surface. Because a safe-side disc is used, it can be extended buccally and lingually (after the opening cut) without abrading the adjacent teeth, helping to reduce mesial axial line angles. If this is done a proximal gingival shoulder will be formed just below the crest of the interproximal gingival papilla (Fig. 10).

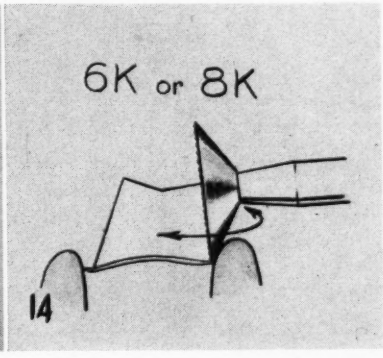
Step 3C—For the distal slice, use a safe-side cup-shaped disc. Starting at the dentin-enamel line hold the disc at an angle of about 7½ degrees up from the occlusal plane. After the initial slice, hold the disc horizontal to the occlusal plane and establish a complete distal slice and shoulder. This slice can be extended buccally and lingually with the same disc (Fig. 11).

Step 4, Further Reduction of Buccal and Lingual Surfaces—For the first time in this technique, the con-



12.. ***Further reduction of buccal and lingual.***





13. ***Shoulders joined.***
14. ***Bevel and finish line.***

tra-angle handpiece is used. This tool should be used with an exceptionally light touch and deft strokes. Start from the gingival and stroke toward the occlusal. This will prepare the gingival shoulders and taper the buccal and lingual surfaces (Fig. 12).

Step 5, Joining Shoulders—Join buccal and lingual shoulders with the interproximal. This diamond stone is used to avoid damage to adjacent teeth and round off safely the buccal and lingual proximal angles (Fig. 13).

Step 6, Finish Line Under Gingival Areas—The bevel is extended below the free margin of both the buccal and lingual gingiva.

Coolants

The use of coolants is recommended for the following reasons:

1. Excessive heat is prevented and discomfort is therefore reduced.
2. Protects the dental pulp, damage is avoided.
3. Keeps preparation clean.
4. Prevents clogging of cutting instruments and subsequent loss of efficiency.
5. The cutting is done cleanly and quickly.
6. Helps cushion vibration.
7. Increases the life of diamond stones and carbide burs, due to the cleaning operation of the steady stream of water.
8. Reduces the amount of anesthesia necessary.
9. Enhances psychologic factors.

Summary

1. The use of increased speeds and a systematic preparation approach reduces the time and energy required for preparation.

2. Efficient cutting tools (carbide burs and diamond stones) increase preparation efficiency and lessen fatigue in the dentist since less hand pressure is required.

3. Increased speed is not indicated for every operative or restorative procedure. Its use must be judicious. Twenty to 30 R.P.M. range is suggested for maximum operating efficiency and minimum tension.

4. Dentists accustomed to working at conventional speeds of 4 to 6 R.P.M. should not convert to high speeds without first acquainting themselves with the technique by starting in the 12 to 18,000 R.P.M. range.

5. Since only 5 to 8 minutes of every working hour is used in cutting down teeth, the primary concern should be improvement of technique and skill.

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GNATHOLOGIC *and* PERIODONTAL *Concept in Oral Rehabilitation – Part One*

LEWIS B. UDIS, D.D.S., and EDWARD L. UDIS, D.D.S., Philadelphia

DIGEST

The concept of oral rehabilitation presented in this article, which is the first in a series of three, combines ideal periodontal therapy with an ideal occlusion. In this concept of periodontal therapy the total elimination of periodontal pockets is required with reattachment of periodontal fibers and regeneration of alveolar bone. The ideal occlusion is a physiologic articulation that incorporates physiologic tooth form and alinement and affords complete freedom of prematurities in every contacting position of the teeth. The ideal occlusion is based on definite recorded information and can be attained through the proper utilization of the Gnathologic techniques described herein.

Principles

Five basic objectives of oral rehabilitation are the following:

1. Elimination of the pockets and prematurities and achievement of a physiologic gingival architecture with reattachment of fibers and regeneration of alveolar bone.
2. Retention of as many teeth as possible free of infection.
3. Avoidance of removable appliances whenever possible.
4. Establishment of a physiologic articulated occlusion.
5. Prevention of the recurrence of the factors that caused the original breakdown.

Fundamental Precept—The philosophy of treatment in oral rehabilitation as presented here is based upon a combination of a physiologic articulated occlusion with an ideal periodontium.[1]

Esthetic Factors—Esthetic qualities are important in oral rehabilitation but the periodontal and occlusal requirements should not be sacrificed in an attempt to achieve esthetic results (Fig. 1).

Case History

The principles outlined are demonstrated in this case. The etiology and diagnosis of the case dictated complete rehabilitation as the treatment of choice.

Conditions Noted—A male patient, age 35, presented with the symptoms of periodontitis and occlusal trauma. A locked bite and prematurities with periodontal and intrabony pockets were present.

Symptoms—The patient exhibited pain in the temporomandibular joint and acute intestinal disturbance of undiagnosed origin. The medical history and physical examination of the patient were negative (Figs. 2 and 3).

Diagnosis

To complete a diagnosis of the occlusal requirements, the following steps were taken:

(1) Study models were mounted on the Gnathoscope in the same functional relationship existing between the teeth in the mouth to each other and to the temporomandibular joint.

(2) Casts mounted with records obtained from the patient's registration demonstrated existing conditions and the corrections that were required to restore normal function.

Overbite and Overjet Present—A marked overbite and overjet were

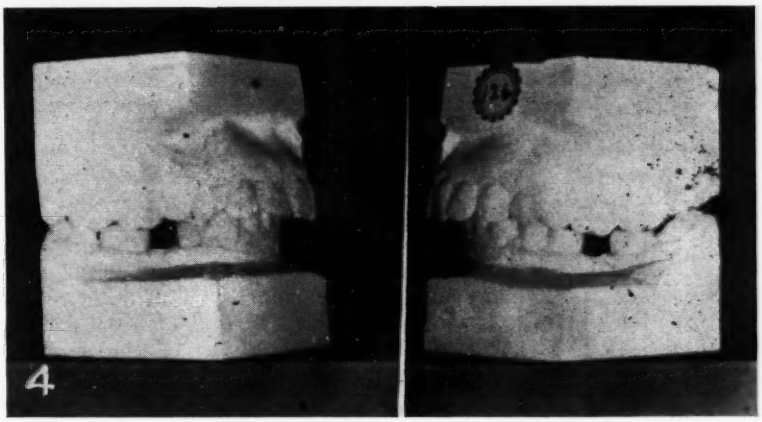
[1]Udis, Edward L., and Udis, Lewis B.: An Occlusal and Periodontal Concept in Oral Rehabilitation, New York J. Dent. **27**:221-227 (June-July) 1957.

1. ***Early loss of mandibular first molars was one of the factors causing a malocclusion resulting in occlusal trauma and lost vertical height. Traumatization of the upper anterior teeth resulted in bone loss with a forward drift on the maxillary incisors and a resulting diastema.***

2. *and* **3.** ***Note the complete lack of occlusion in lateral excursions with worn facets on cuspids, indicating excessive trauma.***

present with a complete absence of freeway space. The existing conditions of this case made occlusal reconstruction through Gnathologic procedures especially essential for a successful result.

Resorption of Alveolar Space—The case also exhibited periodontal and intrabony pockets with a marked resorption of the alveolar crest and mobility due to secondary trauma (Fig. 4).



4. ***The diagnosis from properly articulated study casts is fundamental to a successful restoration. These casts show the conditions that exist and what can be effected to restore health and function.***

The loss of the mandibular first molars with the resulting drifting caused elongation of the maxillary molars. This resulted in a loss of "centric" with marked prematurities and locked bite. The study casts, radiographs, and completed examination indicated that malocclusion combined with local irritating factors was the cause of the periodontal breakdown.

Treatment

Elimination of pockets and restoration of function with an articulated occlusion free of prematurities are essential procedures for successful treatment.

Elimination of Pockets—Gingivectomy was performed on quadrants of the mouth after subgingival calculus was removed and subgingival curettage was completed. Gingivectomy was the treatment of choice to obtain total elimination of periodontal pockets.

Plastic Splints—These were placed in position immediately following gingivectomy to help eliminate trauma and to stabilize the teeth. This facilitated regeneration.

Total elimination of all pockets is an essential factor in successful oral rehabilitation.

Gnathologic Diagnosis and Treatment

Diagnosis of Occlusal Requirements—To complete a diagnosis of the occlusal requirements it is necessary to mount study models on an articulator in the same functional relationship that the teeth in the mouth bear to each other and to the temporomandibular joint. Models mounted without the use of the hinge-axis and condylar registrations fail to indicate the true relationship. If prematurities exist, models mounted with the use of these registrations will close, contacting the prematurities, and will shift into the malocclusion existing in the mouth. Any mounting which fails to incorporate this relationship will not provide information of practical diagnostic value (Figs. 5 and 6).

Movements Reproduced—This information is obtained by the use of the Gnathograph, which reproduces hinge-axis and condylar movements. The use of Gnathology makes possible the reproduction of the fixed biologic factors in combination with those factors not anatomically fixed (Figs. 7 and 8).

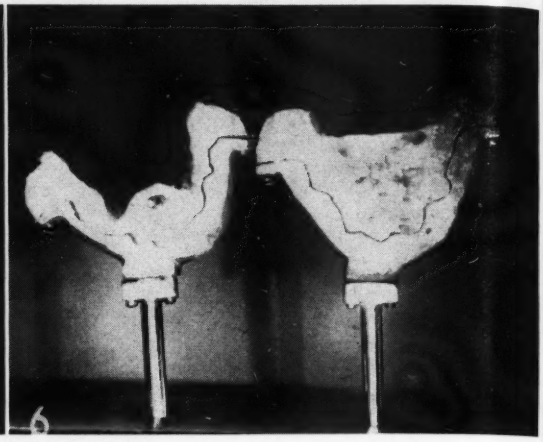
Four Fixed Biologic Factors:

1. Hinge-axis
2. Centric relation
3. Condylar paths
4. Bennett movements

Three Variable Factors (Not anatomically fixed):

1. Incisal guidance
2. Curve of Spee

5. ***The casts are articulated with a hinge-axis transfer and the wax patterns are prepared for the aluminum castings. The casts are prepared for the patterns by relieving all undercuts and allowing space for the zinc oxide paste to be used for the stabilization of clutches to the arches.***



6. ***The completed castings are tapped and threaded to receive the attached studs and for the insertion of the central bearing pin. The castings have been cut along the line following the occlusal surfaces to facilitate removal from the mouth.***

3. Plane of occlusion

Occlusal Concept

Function in ideal occlusion will maintain health of the supporting structures and not lead to their destruction. The relation between metabolic ability and metabolic demands created by function determines the course of disease.

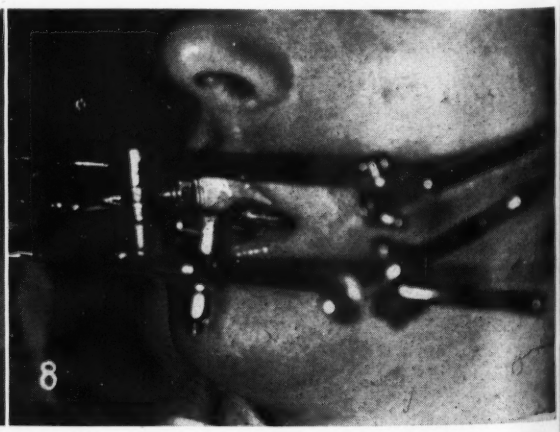
The ideal occlusion is a physiologic articulation, incorporating physiologic tooth form and alinement, based on definite recorded information. This articulation affords complete freedom from prematurities in initial and terminal contacts in every excursion of the mandible, achieving anatomic relations of the teeth in every possible contacting position.[2]

Fixed Components of Mandibular Movement—1) The hinge-axis is the axial center through the heads of the condyles, constant to the mandible, which determines the arc of closure upon which the teeth meet in every position of contact. The hinge-axis can be located with a hinge-axis bow which is attached firmly to the prepared clutch which has been cemented to the mandibular arch.

2) Centric relation is the terminal hinge position, in which the hinge-axis is constant to both the skull and the mandible. Centric occlusion is the relation of the teeth when the cusps are in terminal contact with the opposing fossae. When centric relation and centric occlusion coincide, the mouth is said to be in "centric."

3) The condyle paths of the temporomandibular articulation have exact movements that may be recorded and reproduced.

[2]Granger, Ernest R.: Bio-Mechanics of Periodontal Disease, J. Periodontal. **21**:98-105 (April) 1950.



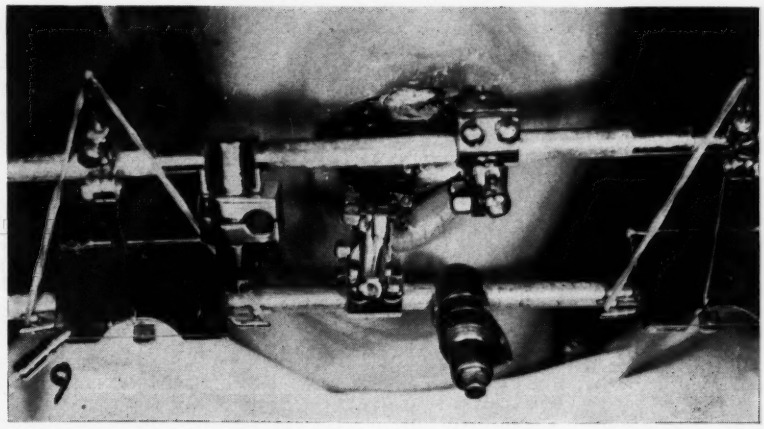
7. ***Clutches have been securely attached to the maxilla and mandible with a hard fast setting impression paste.***

8. ***The hinge-axis recorder has been assembled in preparation for the location of the hinge-axis points. The accurately located points will be permanently marked on the right and left sides when located.***

4) The Bennett movements, which are a part of the condyle paths and are the lateral body side-shifts of the mandible, are the power movements, which take place with the condyles braced against the fossae and make centric relation of the utmost importance.

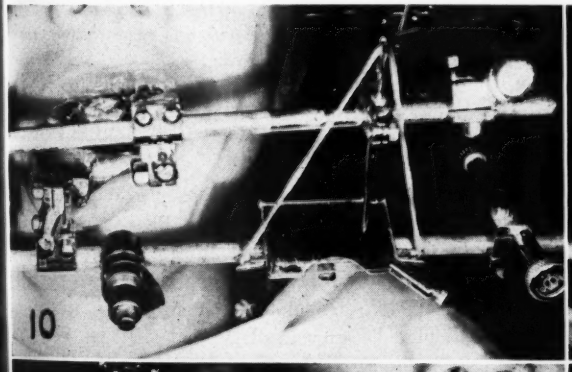
Variable Factors—There are also variable factors, not anatomically fixed, which the operator must determine and adjust to the requirements of the case. These are (1) the anterior or incisal guidance, (2) the curve of Spee, and (3) the plane of occlusion. The relationship of the incisal segments determines the height and form of the cusps. Proper incisal guidance allows for freedom from prematurities in the anterior segment without the necessity of increased vertical height and encroachment upon the freeway space.

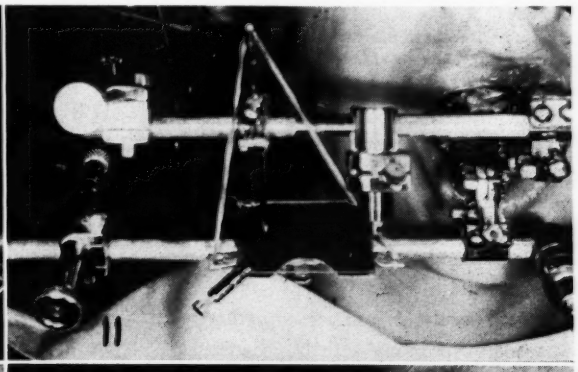
Cusps, Fossae, and Sulci—These fixed and variable factors determine the cusps, fossae, and sulci that are required for proper function in an individual mouth. Cusp height and form vary in individual persons, but under a given fixed set of factors, there is only one set of cusps and fossae that can function in harmony with the movement of the mandible and create a physiologic articulation (Fig. 9).

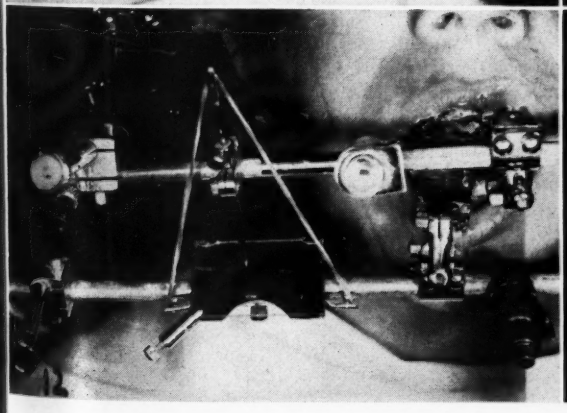


9. ***The recording apparatus used in the Gnathograph which was attached to the cemented clutches and related to the hinge-axis in centric position.***

Movements Recorded—The assembled Gnathograph was used to record the Bennett, Gothic, condylar, and reciprocal movements. These recordings were transferred to the Gnathoscope. The casts were mounted with an axis orbital transfer for diagnosis

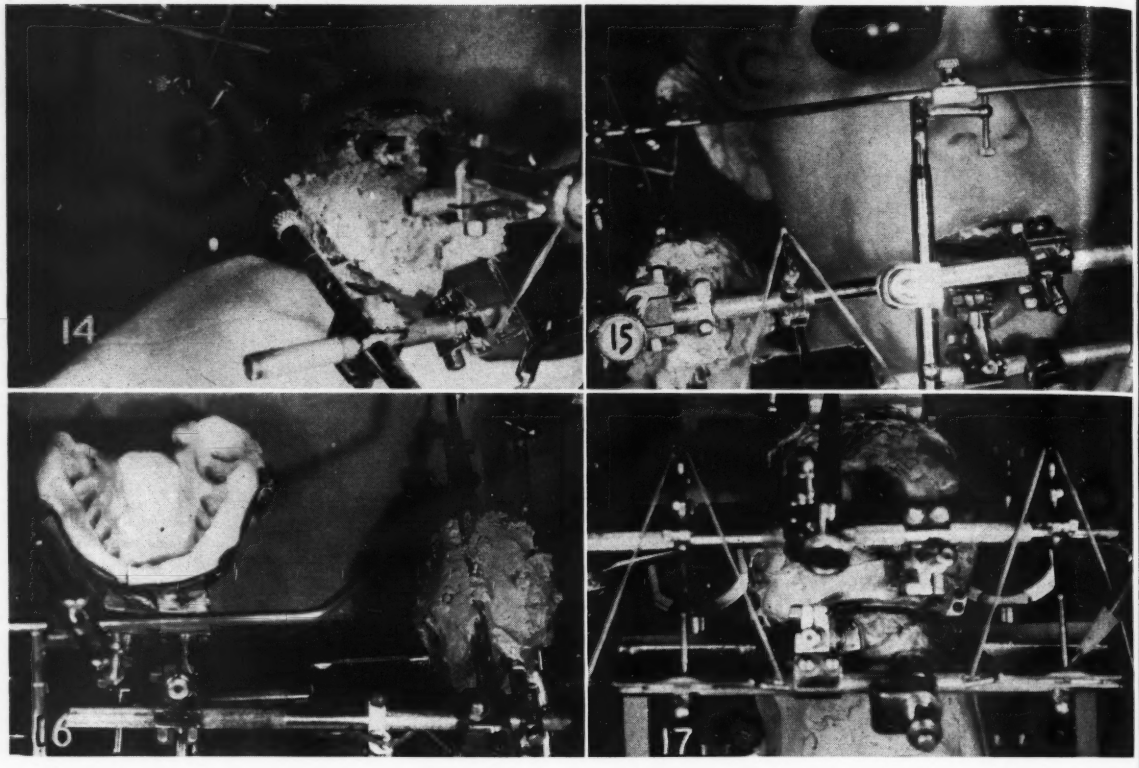






10. ***Right lateral position.***
11. ***Left lateral position.***

12. ***Protrusive position.***
13. ***View of Bennett slide.***



14. ***The patient in centric position with face-bows locked securely with stone in preparation for removal from clutches.***

15. ***Orbital indicator is placed in position after the stone is set. This is the third point of orientation to allow for mounting of the casts to the Gnathoscope.***

16. ***The recording device (Gnathograph) removed from the mouth.***

17. ***The Gnathograph mounted on the gnathoscope in preparation for the recording of the patient's mandibular movements.***

and complete treatment planning.

Elimination of Prematurities—The occlusal diagnosis revealed prematurities that indicated the patient had an acquired occlusal relationship that was not in harmony with his centric relation. Treatment planning included the elimination of this "eccentric" occlusion. As shown in Figures 10, 11, 12, and 13, the two horizontal styluses in the condyle region record the condyle paths. The two vertical styluses in front record the Gothic arch tracings of the lateral jaw movements.

Reproduction of Mandibular Movements

Any instrument that cannot record and duplicate all of the patient's mandibular movements will fail to allow for fabrication of articulated restorations. By means of the Gnathograph and Gnathoscope these movements can be faithfully reproduced.

The Bennett Movements—Knowledge of the patient's Bennett paths is of utmost diagnostic importance. Each patient has Bennett paths that are specific to him and the two sides of the patient may also differ. The influence of the Bennett movement is such that failure to reproduce it properly will not allow the teeth to articulate in conformity with jaw movements.[3]

The Condyle Paths—These are as important as the Bennett paths and have variations in inclination and curvature. The curvature in condyle paths varies from almost straight lines to sharp curves. The curvature of one path may differ from that of another path (Figs. 14, 15, 16, and 17). (End — Part One)

5409 *Germantown Avenue*

[3]McCollum, B. B., and Stuart, Charles E.: A Research Report, D. Items Int. (June) 1939 to (February) 1940.

Treatment of a CLOSED BITE *with Extensive Diastemata*

W. R. WHITE, JR., D.D.S., Tuscaloosa, Alabama

DIGEST

This case history stresses the importance of patient education. By explaining to the patient the extent of the treatment required it was possible to undertake a necessary partial rehabilitation for correction of a dental deformity. The step-by-step procedure employed is described.

Case History

The patient in this case was a nurse in her middle thirties. She presented for consultation and treatment of an oral condition which she described as a large space between the anterior teeth. The patient stated that space between the anterior teeth had always existed, but in recent years had increased.

Clinical Findings

Examination revealed that the spaces were due to two conditions: (1) The laterals were smaller than usual. (2) The early loss of the first molars on the mandibular ridge had allowed the teeth to shift and the bite to close with the lower anteriors crowding the upper anteriors labially (Figs. 1 and 2).

Treatment

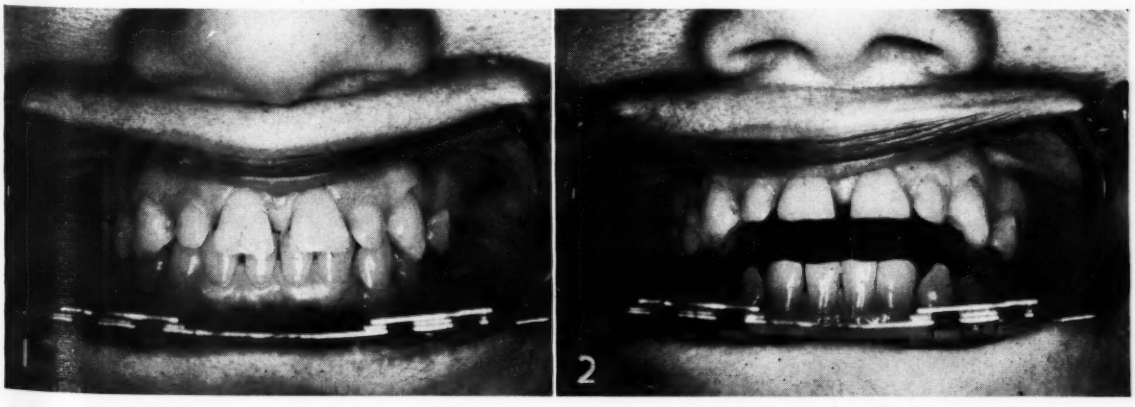
The following steps were taken:

1. The bite was opened and the anterior teeth were moved back over the maxillary ridge. This was done with two appliances as shown in Figure 3.

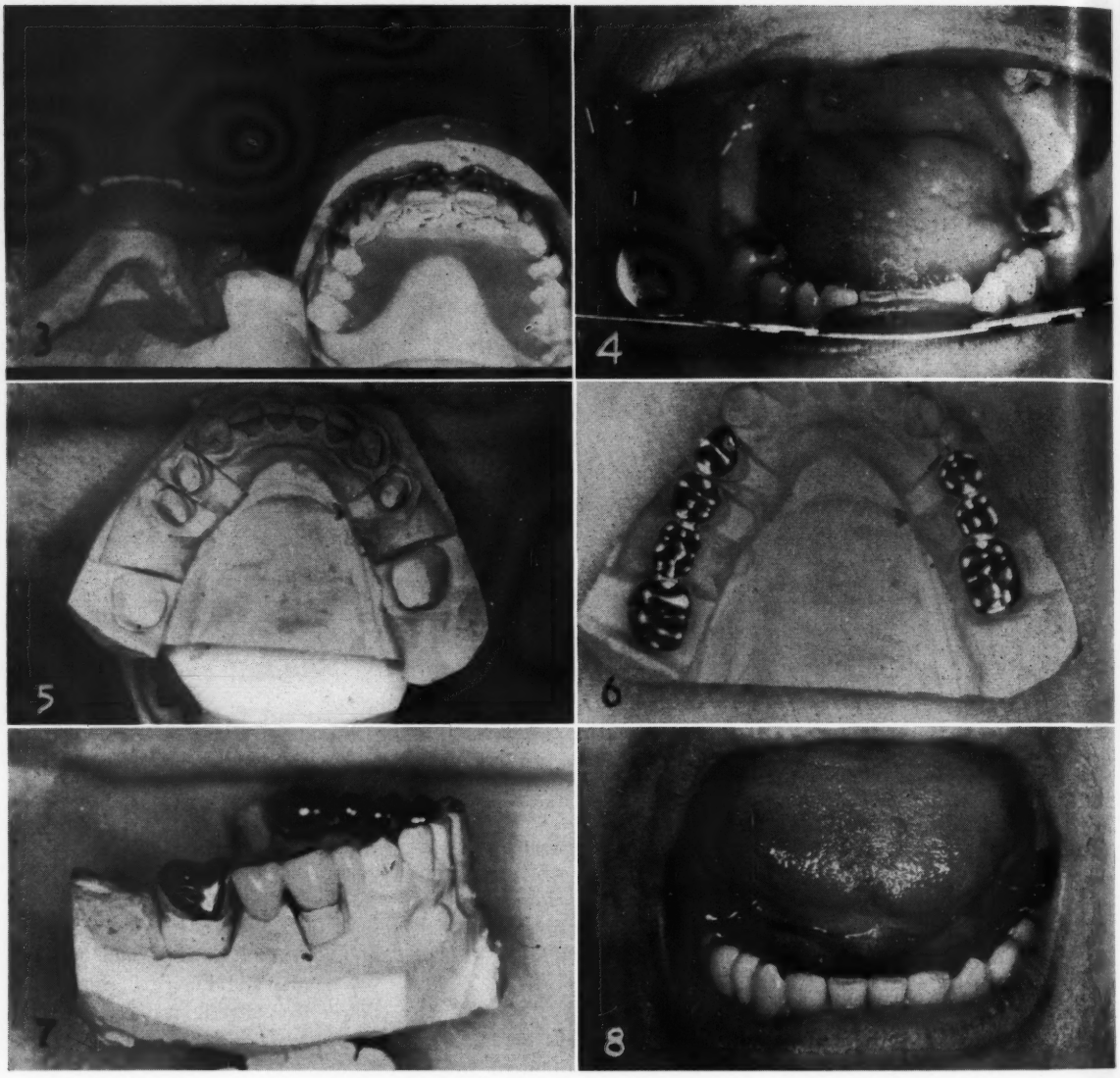
2. The splint was placed on the mandibular teeth to open the bite to the desired amount and the orthodontic appliance was placed on the upper anterior teeth to bring them back over the ridge. The splint to open the bite was worn about six weeks.

3. When the desired bite opening was obtained with no discomfort to the patient, the lower teeth were prepared to receive two fixed bridges to maintain this opening. Figure 4 shows the lower teeth before preparation. Figure 5 shows the dies after preparation. Figures 6 and 7 show the model and Figure 8 shows the lower arch after its restoration.

Upper Arch Restored—It was now possible to restore the upper arch with the exception of the anterior teeth which were still in the process



1 and 2. ***Appearance of the patient before treatment.***



3. ***Right, appliance used to bring anterior teeth back into more normal position. Left, acrylic splint used to open bite and used as temporary for lower posterior teeth after they were prepared.***

4. ***Mandible as it appeared before preparation.***

5. ***Lower preparations.***

6. ***Lower bridges on dies.***

7. ***Another view of bridges shown in Figure 6.***

8. ***Lower bridges in mouth.***

of being moved back into position. Figure 9 shows the missing upper bicuspid. This was replaced with a double abutment on the molar and second bicuspid. Figure 10 shows the finished case.

Additional Steps—1. The patient was seen every week and the upper appliance was adjusted for a period of six months until the upper anterior teeth were in the proper position.

2. The centrals and laterals were prepared for acrylic veneer gold crowns. They were placed parallel to each other so that the appliance could be soldered together to prevent movement of the individual teeth in the future.

3. These were cemented in place and the case was finished. Figures 10, 11, and 12 show the completed case. Figures 13, 14, 15, and 16 show the models of this case before and after treatment.

Comment

It is the opinion of the author that the average patient does not know the specific dental treatment required. This patient only wanted the spaces between the anteriors reduced. By carefully educating the patient, she was convinced of the necessity of a partial rehabilitation in order to correct the dental deformity permanently.

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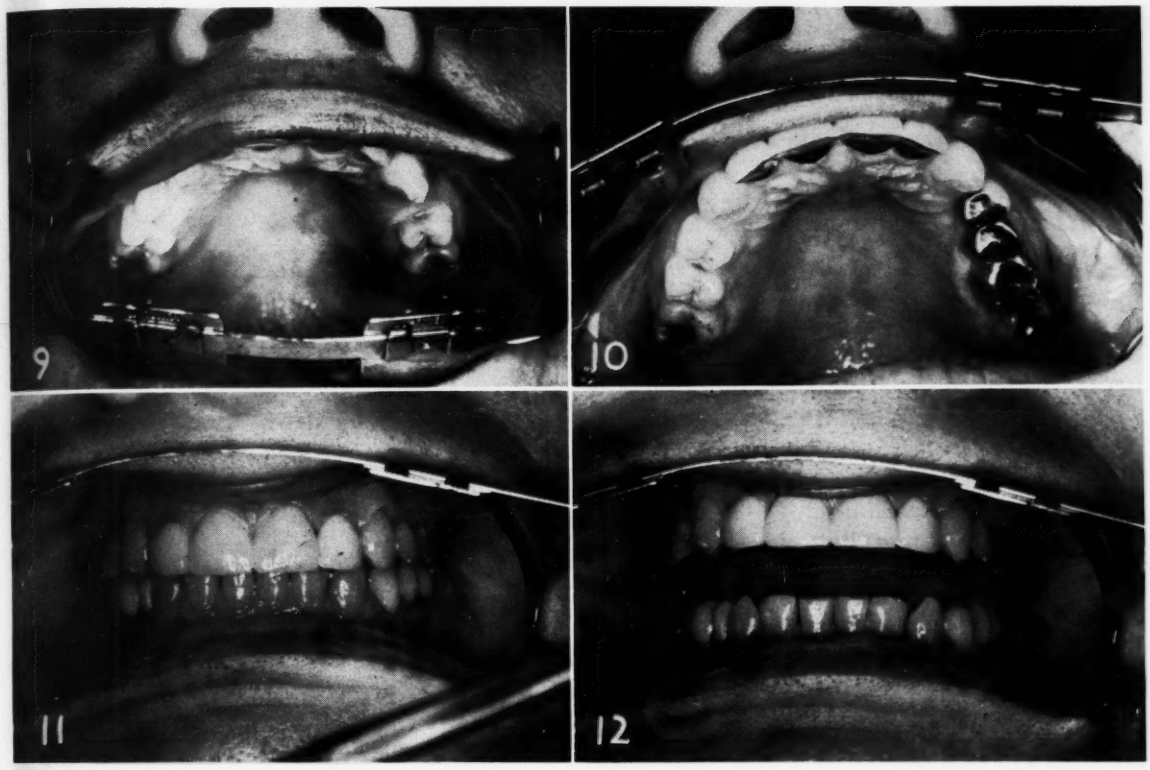
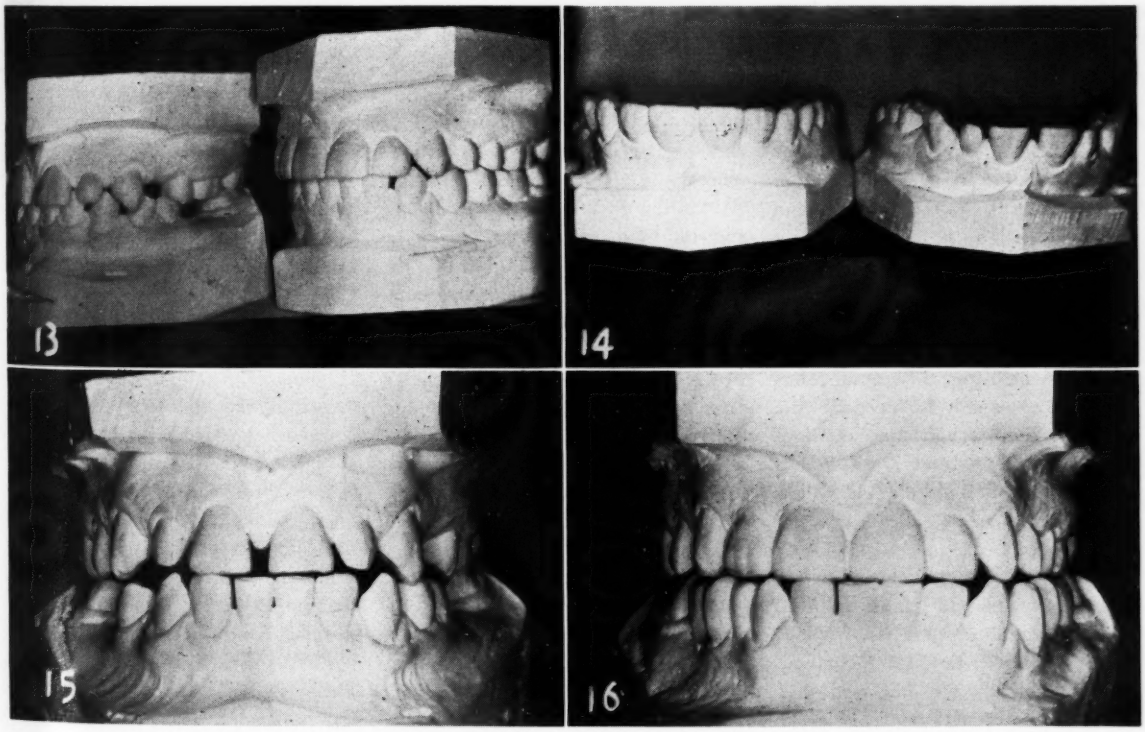


9. *Appearance of maxilla before treatment.*
10. *Maxillary arch with appliance in place.*
11. *The patient with teeth in new centric relation after completion of treatment.*
12. *Patient with teeth apart after treatment was completed.*



13, 14, 15, and **16.** *Models of the case before and after treatment.*

Some Confusing Precepts in ARTICULATION—

Part Two

HARRY L. PAGE, Valparaiso, Indiana

DIGEST

In this, the second installment of a two-part article, is continued the discussion of plausible, but erroneous and confusing articulation precepts found in current literature.

Misconceptions of principles underlying the cranial plane, centric relation, and condyle paths are cited and answered.

The Cranial Plane

On this subject, complete dismissal by the critics is the rule and, again, such dismissal comes from lack of training in the foundational sciences

Movement in Horizontal and Transverse Planes—Critics of the cranial plane have judged it as though it had to do with jaw rotation in the sagittal plane (opening and closing) whereas it has to do with jaw rotation in the horizontal (side-to-side) and transverse (jaw rocking) planes instead. If the jaws functioned by opening and closing in the sagittal plane alone, no cranial reference plane would be needed; the maxillary and mandibular relationships could be mounted in any quadrant of a full 360° circle and would be entirely correct.

Right and Left Movement of Jaws—The jaw also functions by swinging to the right and left of the mid-sagittal plane as proponents of lateral motions would be the first to contend. That they should also be the first to condemn the cranial reference plane is, therefore, incomprehensible.

Conventional Method of Mounting Casts Described—Collett[9] states: "We mount most of our cast with the plane of occlusion parallel, or nearly so, with the bows of the articulator when, in reality, the plane of occlusion in the mouth is on an incline and not parallel with the Frankfort horizontal plane . . . I can see no reason for an exact orientation (as recommended by Wadsworth and McCollum) except perhaps that we can judge the esthetic effect a little better."

Conventional Opinion on Worth of Cranial Plane—Collett shows a figure similar to Figure 6 in this article. Referring to his figure, Collett continues: "The angles A, B, and C formed by the condylar inclination and the occlusal plane are equal; therefore, all three orientations should give equivalent results. [Mounting position] 3 represents the position of a cast mounted from the records made in relation to the Frankfort horizontal plane as recommended by Wadsworth and McCollum."

No Bearing on Problem—Collett's statement that the angle "formed by the condylar inclination and the occlusal plane" will be constant regardless of the position given the casts in the sagittal plane can be disregarded as irrevelant.

No Condylar Path in Final Closure—Of significance here is the perpendicular distance from the vertical axis of the *working* condyle to any given point such as X on the mounted casts (Fig. 6). In final closure (the terminal functional orbit), the working; that is, the controlling condyle, does not follow any "condylar inclination" or path; except for the Bennett, it rotates only.

Occlusals Incorrectly Shaped for Function—If a mounting of the occlusal relationships and occlusal plane at number 3 position is correct, then a mounting at either number 2 or 1 position will place any given point (such as X or a tooth) further away from the vertical axis of each *working* condyle. Consequently, when a functional jaw rotation that arcs to the right or left is made, this tooth must follow a much flatter arc in the horizontal plane than the arc it follows in the head. Discrepant arcs in the transverse plane will also occur. The result is occlusals incorrectly shaped for function.

Detrimental Effects from Incorrect Vertical Axis—After his elaborate attempt to support an assertion that the cranial plane is of no consequence, Collett[10] goes on to show the detrimental effects when a working condyle's vertical axis in the articulator is incorrect. Again, he illustrates with drawings and states: "When an occlusal scheme with high cusps is constructed on an instrument where the center of rotation is distant from the one presented by the patient, the contacts in lateral excursions will be traumatic . . . The amount of trauma will be in direct proportion to the distance from the correct axis."

Radius can be Disrupted at Either End—If an incorrect center of rotation has such traumatic consequences, it must be equally certain that to

[9]Collett, Henry A.: The Movements of the Temporomandibular Joint and Their Relation to the Problems of Occlusion, J. Pros. Dent. 5:490 (July) 1955.

move the rotated object closer to or farther away from its rotation center will have an equal effect. It requires no serious thinking to realize that a radius can be disrupted at either end.

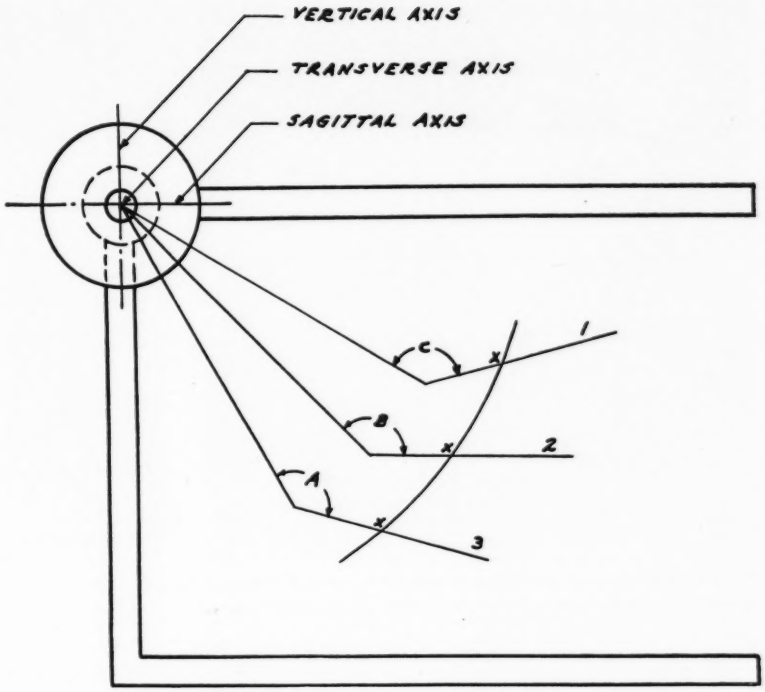
Transference of Cranial Plane in Conventional Articulator Impossible—Since a cranial plane is needed to maintain a constant relationship between the maxillary occlusal plane and the vertical and sagittal hinge-axes, it is clearly impossible to transfer a cranial plane to or maintain it in a conventional articulator. To do so would require that these axes and the occlusal plane all be related and mounted on the same articulator frame (Figs. 7 and 8). Unfortunately, most popular conventional instruments are built with the axes in the lower frame and with the occlusal plane mounted on the upper frame.

Axes and Occlusal Plane Act Independently—Instead of the affected axes and the occlusal plane being joined in the mounting, and thereafter acting as a unit, they are mounted and thereafter act independently. As a consequence, the use of a so-called "axis-orbital indicator" and "axis-orbital plane" on most conventional instruments is a waste of time and effort. Again, the need for training in foundational science is demonstrated.

Fallacies in Conventional Theories

In bringing these changes in principles to dentistry, it has been necessary to reveal fallacies in conventional theories. This has provoked a storm of antagonism. It would seem that despite acknowledged unhappy results, articulation leaders prefer to live with and defend ills they know rather than entertain unfamiliar ideas even when such are proved correctives. An excellent example is provided by the reception given Rader's[11] exposition on the fallacy of centric relation.

Futility of Centric Relation—While Rader did not argue that there was no such thing as centric relation, he did show the futility of trying to utilize it. He made it clear that there was absolutely no way to transfer a static condylar position to an articulator or use it to set up teeth or fashion occlusals on crowns that would function correctly when installed in the mouth.



6 INCORRECT AXES AND OCCLUSAL PLANE POSITIONS IN CONVENTIONAL ARTICULATOR

6. *Incorrect axes and occlusal plane positions in conventional articulator.*

Centric Relation an Inaccessible Position—Rader could have shown the equally impossible task of locating centric relation in the head. Centric relation is what is known in mathematics as an inaccessible position; that is, a position that cannot be reached and measured physically. It is universally known that an inaccessible position or body cannot be located exactly except by the use of mathematical coordinates.

Six Coordinate Planes Required—In the case of centric relation, it would take six coordinate planes (three for each joint) to orient the condylar-fossae positions and occlusals properly. But to use coordinates in the absence of points of reference, it must be possible to see the objective. It should suffice to say that no one has ever seen or will ever see a centric relation.

Disagreement with Exposition — Boucher[12] objects to Rader's exposition. His editorial comment may be divided into three parts:

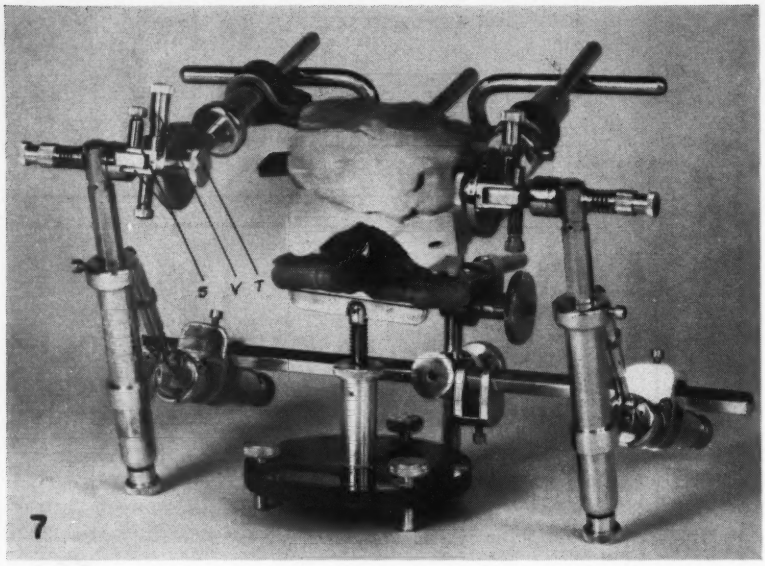
1. Rader's motives in condemning centric relation are questioned: Boucher says, "This is a statement that is worthy of analysis as to the reason for its being made as well as to its validity." Why Rader would have an ulterior motive in a candidly expressed and thoroughly substantiated conclusion on a scientific problem and in what way he might hope to profit if he were trying to promote a fallacy is not revealed.

2. Boucher impugns Rader's knowledge of conventional dental principles: he says, "However, if the em-

[10]Collett, Henry A.: The Movements of the Temporomandibular Joint and Their Relation to the Problems of Occlusion, J. Pros. Dent. **5**:493 (July) 1955.

[11]Rader, Albert F.: Centric Relation is Obsolete, J. Pros. Dent. **5**:333-337 (May) 1955.

[12]Boucher, Carl O.: Editorial, J. Pros. Dent. **5**:295 (May) 1955.



7. ***Upper occlusal plane being mounted in constant relationship to axes. S, slider containing sagittal axis; V, vertical axis; T, transverse axis.***

phasis is placed on positions of the condyles, and if the relation of the condyles in their fossae is considered the major consideration in a definition of centric relation, there is doubt about the author's understanding of the definition. The position of the condyles is only one of several considerations in a definition of centric relation, while the major consideration is the relation of the two jaws to each other when several specific conditions exist." Such a charge calls for the definition of centric relation.

Definition of Centric Relation—At the time (1955) Rader's article was published, the definition of centric relation (the one officially endorsed by the American Dental Association) read as follows: "The most retruded position of the condyles in their fossae from which lateral motions can be made at a given vertical dimension."

Recent Definition — The latest (1956), although still not an official definition evolved by the Prosthodontic Nomenclature Committee, reads, "The most retruded relation of the mandible to the maxillae when the condyles are in the most posterior unstrained position in the glenoid fossae from which lateral movements can be made, at a given degree of jaw separation."

No Difference in Meaning—Except for the addition of the irrelevant "unstrained" the use of the anatomically incorrect "glenoid fossae"; and verbosity, there is not the slightest difference between the meaning of the two definitions; both place all emphasis upon the static *positions* of the *condyles in their fossae* with the jaws as a *fixed vertical dimension;* that is, "jaw separation." The conclusion is that Rader is more conversant with the definition of centric relation than is his critic.

3. Boucher questions Rader's ability to compare and evaluate a result with this statement: "There seems to be a lack of evidence for the conclusions, since reference is made to 'almost universal enthusiastic reports from its [Transographic] users.' Clinical evaluations alone are nebulous and relative and unreliable." Rader is not speaking of experiments; he is talking about extended observation of *everyday practical results* in a large number of offices as well as his own. Rader and those who agree with him have had more than ample personal experience with every concept known to and endorsed by conventional teaching and have found the results of each inferior to those produced by Transographic concepts. By what means other than "clinical evaluations" are results to be judged?

Deficiencies of Centric Relation Confirmed—Nagle[13] states: "Placing the mandible into the position of retrusion and muscular balance by any method, be it single or multiple gothic arch tracing, is of little value unless the rotational axis can be transferred to the articulator. When this is completed, and only then, measurements and records are transferable to the articulator. Unless such transfers are made, restorations cannot meet the requirements of function."

Functional Range Must be Provided—Nagle[14] adds: "More and serious analysis must be given to physiologic centric relation once it has been determined. If this one relation is used as the sole basis for the mandibular position, a destructive process will occur. It must be remembered that mandibular movements begin with the condyle in its normal retrusion, and they end in the same position. Because of this, there is a functional range which must be provided for if natural, uninhibited function is to be restored."

Centric Relation Useless in Functional Articulation—Nagle seems to have given studious thought to the problem and to have arrived at the same truth stated by Radar[15]; that is, ". . . centric relation is merely a static position of the jaw that is useless in functional occlusion." It may be noted that Rader's[16] article as originally submitted carried the expression "functional articulation."

Meaning Changed—In editing, this was arbitrarily changed to "functional occlusion" a change that completely altered Rader's meaning. Boucher[17] then denies what is really his own statement as being ". . . subject to severe criticism because it indicates a possible lack of understanding or misinterpretation of the term 'functional occlusion.' "

[13]Nagle, Raymond J.: Temporomandibular Function. J. Pros. Dent. **6**:356 (May) 1956.
[14]Ibid.
[15]Rader, Albert F.: Centric Relation is Obsolete. J. Pros. Dent. **5**:333 (May) 1955.
[16]Rader, Albert F.: Personal Communication.
[17]Boucher, Carl O.: Editorial. J. Pros. Dent. **5**:295 (May) 1955.

Similar Conclusion — Lucia[18] has approached the same conclusions as those of Nagle and Radar: "Without an axis mounting . . . you cannot accurately adjust an articulator to reproduce jaw movements. You cannot fashion an articulation that has cusps meshing in the same arcs of closure as the patient . . . You cannot check or prove a centric relation record." In short, Nagle and Lucia are mutually close to the realization that centric relation is not only completely worthless in functional articulation but is actually detrimental wtihout transverse hinge-axes. These hinge-axes being the *important* consideration upon which even centric relation is dependent, it is patent that centric relation is superfluous.

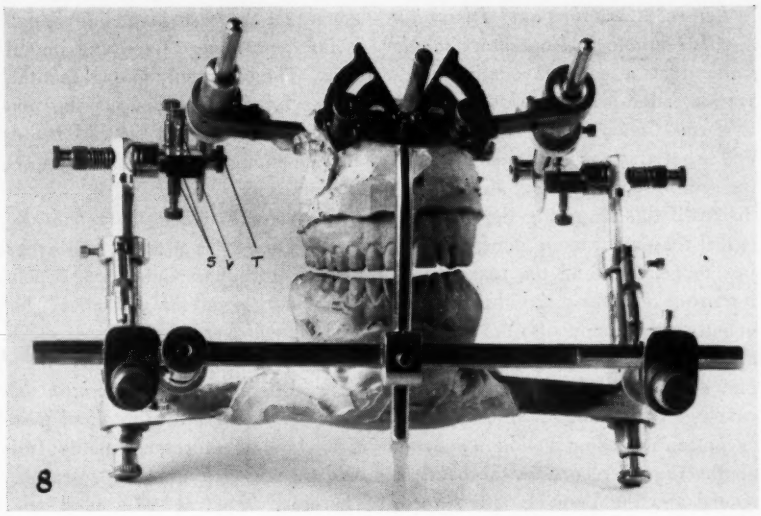
Impossible to Locate or Transfer Centric Relation — As it is mathematically impossible to locate centric relation or to transfer and utilize it in an articulator, dentistry would do well to forget this ninety-year-old chimera.

Centric Relation Destructive — There is another possibility which dentistry would be wise to consider: centric relation, as Nagel has observed, is "destructive." It has been and continues to be responsible for the destruction of countless millions of mouths, both dentulous and edentulous.

Results of Careless Publication

Publication seems to provide an immunity to criticism and an authority that passes understanding. Cohen[19] writes: "Unfortunately for dentistry, our society meetings and literature have become platforms for long-winded debates. Opinions are expressed emotionally and eloquently without scientific truths as backgrounds. Energetic research, and not words, is needed."

Are Condylar Paths Constant?— Cohen[20] proposed ". . . to find out the effect on the condylar guidance when the shape of the anterior guidance is altered and when the occlusal vertical dimension is increased. In other words, are the paths of movement of the condyle constant, regardless of its anterior guidance or degree of maxillomandibular opening?"



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8. ***Transograph chewing on right side. Axes remain constant to occlusal plane. S, slider containing sagittal axis; V, vertical axis; T, transverse axis.***

Clinical Experiment — Cohen cemented a maxillary clutch with interchangeable palatal forms (concave, convex, and flat) and a mandibular clutch with a jacked up bearing pin in a subject's mouth. With each change of palatal form and with the pin and plate maintaining contact, three nonfunctional jaw movements were made: (1) right radial-protrusive, (2) left radial-protrusive, and (3) protrusive.

Condylar Movements Caught—By means of the McCollum Gnathograph, pantographic tracings of these nonfunctional jaw movements were caught in the condylar region and also anterior to the symphysis, and later etched permanently upon glass slides.

Observations — According to Cohen[21] all etchings on different plates that were given the same head positions in the condylar region were identical regardless of the difference in palatal form used to change the jaw movements. Concerning the tracings in the anterior region, Cohen[22] says: "There were no two alike. These tracings are not condylar tracings. They are tracings made anterior to the anterior guidance and are the total result of condylar guidance and anterior guidance. Since condylar guidance is constant, a change in anterior guidance changes the anterior tracing."

Interpretation—All this was taken to mean that[22] ". . . in any individual the condylar guidance is fixed and immutable" and that "The paths of movement of the mandible are governed by the condylar guidance and anterior guidance."

"Scientific Background" Lacking —Cohen's stated objective ignores the reason for the nonfunctional jaw movements used to obtain the pantographic tracings in his chosen research medium; that is, Gnathology. His claim that the "condylar guidance is fixed and immutable" brushes aside the reason why tracings in Gnathology are limited to radial-protrusive jaw movements only. His conclusion that "The paths of the mandible are governed by the condylar guidance and the anterior guidance" shows him to be unaware of the nature and functions of universal joints.

[18]Lucia, Victor O.: The Fundamentals of Oral Physiology and Their Practical Application in the Securing and Reproducing of Records to be used in Restorative Dentistry, J. Pros. Dent. **3**:214 (March) 1953.

[19]Cohen, Raymond: The Relationship of Anterior Guidance to Condylar Guidance in Mandibular Movement, J. Pros. Dent. **6**:758 (Nov.) 1956.

[20]Ibid.

[21]Ibid., p. 763.

[22]Ibid., p. 767.

Return "Condyle Path" Dissimilar—All Gnathological operators *should* know that a condyle coming back from a radial-protrusion does *not* follow what Cohen clearly believes to be and what Granger[24] mistakenly calls the same "return paths." McCollum[23] disclosed this in giving the Gnathological reason for using nonfunctional jaw movements and the reason, too, for using only their radial-protrusive or outward components: ". . . there is a simple explanation why we pull the pins on the back stroke . . . it is the envelope of motion . . . the envelope of motion record on a slide . . . covers up the line of record in the condyle record and the Bennett path record. So we do not allow the return stroke to muss up our record." The following will help make the application of his statement clear.

Envelope of Motion

The simplest and most effective way to capture an envelope of motion is to capture rotational centers. If rotational centers in all three dimensions are captured, the envelope of motion is obtained automatically.

Pantographic Tracings Used — In seeking the envelope of jaw motion in a Gnathological writing, pantographic tracings (not to be confused with actual duplicates of jaw movements) of nonfunctional radial-protrusive laterals are used in an attempt to locate the vertical axis of each working condyle around which rotation in the horizontal plane takes place in the head and to provide a means of adding this vertical axis to the transverse axis in the Gnathoscope.

Nonworking Condyle Path not Fixed—That there is a different condyle path on the return or medial-retrusive lateral stroke from that on the outward or radial-protrusive lateral stroke will not negate efforts to locate the vertical axis for the same vertical axis of the *working* condyle controls the horizontal component of the arc in both paths. But it does mean that a *nonworking* condyle *path* is far from being "fixed and immutable." The commonly known fact that cuspal interference deflects the nonworking condyle from its path should also be enough to refute its supposed immutability.

Obstacles Produce Discrepant Results—The very nature of his experiment contradicts Cohen's[25] conclusion that "condylar guidance" has any control over "the paths of movement of the mandible." By using three differently shaped *mouth obstructions,* he readily obtained three different jaw movement paths; this was the essence of his "research." Therefore, control of mandibular movements was vested in intraoral obstacles to which neither the condyles, the condyle paths, nor the incisal tracing plates offered the slightest resistance. Tough foods form similar obstacles and produce even more discrepant results as was demonstrated practically by Hollenback[26] in 1928.

Tooth Guidance in Functional Movement — Thompson[27] noted that when cuspal interference is present . . ."the tooth guidance dominates the normal guidance of the articular eminence, and the condyle is forced away from the articular eminence in function." Like Hollenback, Thompson dealt with functional, not nonfunctional movements. That the nonworking condyle does not follow a "fixed and immutable" path in *function* (the only type of jaw movement that is important) and actually breaks contact with the fossa when necessary to accomodate mouth obstruction is logical.

Flexible Movements of Condyle—There are no ligaments or muscles holding a translating nonworking condyle forcibly against the ceiling or "curbing" of the fossa; it does not glide in an inflexible groove. This is fortunate. If it could not "roll with the punch" as the occlusals meet harsh or unexpected obstacles, the joint would suffer serious damage.

Changes in Movement Pathways of Mandible—Cohen's dissimilar anterior tracings passively recorded the amount by which the different intraoral obstructions changed the movement paths of the mandible. Whether the path of the nonworking condyle (only a nonworking condyle scribes a condyle path) did or did not follow a fixed recorded path in this experiment means nothing.

Universal Joint—As Cohen himself has so clearly demonstrated, even in these nonfunctional movements the nonworking condyle rotates and translates simultaneously in not less than two dimensions in obedience to the demands of musculature and mouth obstructions. Thus, it constitutes one of the most common types of universal joints known. Be it constant or inconstant to a condyle path, it cannot be a "guidance," for *a universal joint guides nothing;* it is merely a completely adaptable and, in this case also, a movable fulcrum[28].

Comment

Specific instances of erroneous published statements on articulation, with their authors, have been discussed in the hope that would-be authorities may be persuaded to make sure of sound information before publishing or lecturing. This should lessen the bewilderment of those sincere dentists who are eager to improve but are confused by the endless stream of contradictory theories all coming from supposedly authentic sources.

104 *Garfield Avenue*

[23]McCollum, Beverly B.: Personal Communication, 1944.

[24]Granger, Ernest R.: Functional Relations of the Stomatognathic System, JADA **48**:644 (June) 1954.

[25]Cohen, Raymond: The Relationship of Anterior Guidance to Condylar Guidance in Mandibular Movement, J. Pros. Dent. **6**:765 (Nov.) 1956.

[26]Hollenback, George M.: Personal Communication, 1955.

[27]Thompson, John R.: Concepts Regarding Function of the Stomatognathic System, JADA **48**:636 (June) 1954.

[28]Page, Harry L.: Occlusal Movements and Obstructions: The Bennett Movement, DENTAL DIGEST **61**:348 (August) 1955.

The EDITOR'S Page

THE END-RESULT in denture construction is to restore the dentition and to improve appearance. The prosthodontist is concerned with the reconstruction of the teeth and with the restoration of the face. Dentists have given careful emphasis to the *teeth*, but not enough to the *face*.

The human face usually continues to develop slightly after body growth is completed. But, in general, facial growth has ended at age 20.

After the completion of the dentition this anatomic unit is subject to the wear and tear that all tissue must undergo. In the case of the teeth the stress and strain of living, and the results of disease, are observable. In the vital body parts that are hidden from the eye the results of wear and tear are recorded by changes in the function of the parts rather than by observable evidence.

Loss of teeth from disease or accident may change the facial heights and configurations. The normal wear of the exposed surfaces of the teeth is compensated by a degree of continuous and active eruption of the teeth and thus no noticeable change in facial dimensions is to be expected.

A Finnish dentist set out "to investigate the morphologic face height, the rest face height, and the interocclusal clearance,

"(1) in adult dentulous material, in order to illustrate the *age changes* in the total adult period;

"(2) in abrasion cases, in order to illustrate the changes in the above-mentioned facial dimensions induced by *abrasion* of the teeth;

"(3) in a group of denture wearers, in order to illustrate the changes in the facial dimensions accompanying *long-term use of dentures*.

"(4) The intention is also to study the gradual changes in facial height *after extraction of the teeth*, after prosthetic treatment, and during the *first year of wearing dentures*."[1]

Before giving the conclusions in this study it may be helpful to define the terms of reference:

Morphologic face height is determined by the occlusal position of the mandible. It is recorded when the upper and lower teeth are occluded.

Rest face height is dependent on the postural position of the mandible. It is recorded when the teeth are separated and the mandible is in the normal rest position. The separation is the interocclusal clearance or free-way space.

The conclusions reached by Tallgren and recorded in the same sequence as the objectives previously mentioned are:

(1) *Age Change*—"The results indicate a continuous increase in both the morphologic and rest face height during the adult period, the interocclusal clearance remaining, on average, constant during this synchronous development."

(2) *Abrasion*—"The abrasion of the dentition appeared to cause a marked reduction of the morphologic face height, resulting in an increase of the interocclusal clearance."

(3) *Long-term Use of Dentures*—"Causes pronounced changes in the facial dimensions, the reduction of the morphologic face height being accomplished to a considerable extent by a reduction also of the rest face height."

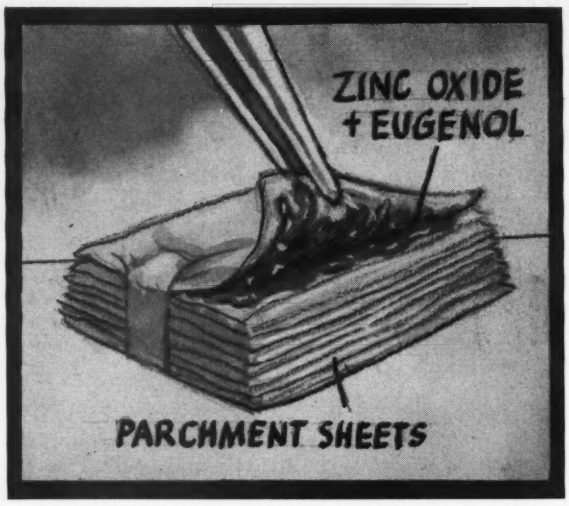
(4) *Extraction*—"The rest face height after tooth extraction showed an average reduction of 1.4 millimeters."

After Prosthetic Treatment—"As the increased face height caused by prosthetic treatment was found to be greater in persons with low face height, a thorough study of the facial type is to be recommended at prosthetic treatment and, if possible, a registration of the face height before extraction of the teeth."

First Year of Wearing Dentures—"The marked reduction of the face height during the first half-year of denture wear points to a period of adaptation, followed by a stabilization during the second half-year period . . . Regular control of the face height and relining of the dentures are to be recommended during the years following prosthetic treatment."

Clinical experience verifies the facts presented in this study. There is no finality in full dentures. The dentist should let the patient know that denture-wearers require regular examination and often additional treatment to maintain efficient function and to preserve appearance.

[1]Tallgren, Antje: Changes in Adult Face Height due to Ageing, Wear and Loss of Teeth and Prosthetic Treatment, Acta Odontol. Scandin. **15**:113 (Supplement 24) 1957.



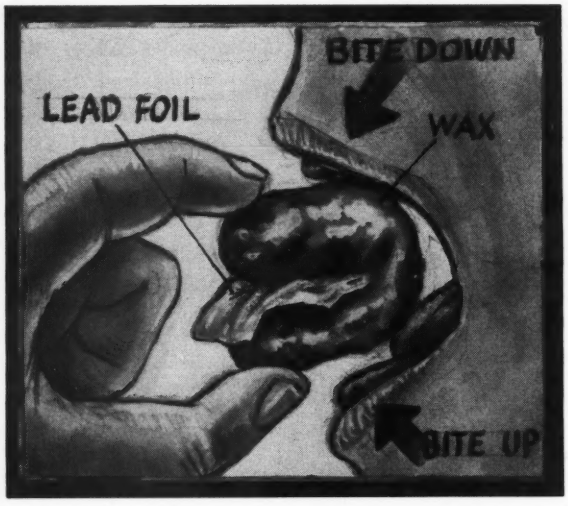
1

Clinical and Laborato

Storage of Zinc Oxide-Eugenol Paste

H. J. Bonacker, D.D.S., Cleveland, Ohio

1. Zinc oxide-eugenol paste may be kept workable for days by mixing it and then placing the mixture between sheets of parchment paper.

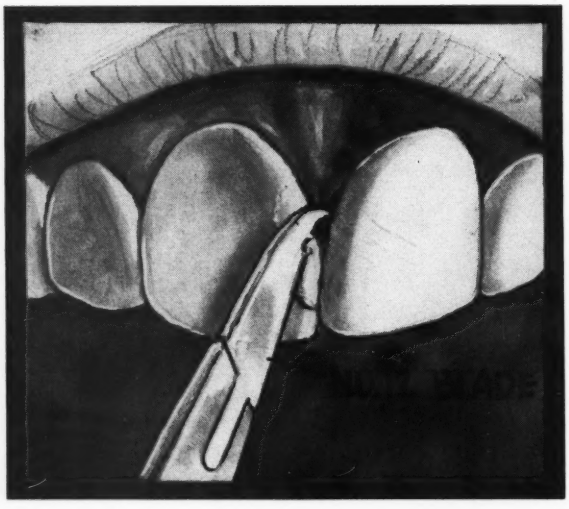


2

Strengthener for Wax Bites

H. A. Paskow, D.D.S., Elizabeth, New Jersey

2. After softening pink baseplate bite wax, fold a piece of lead foil from an x-ray film into the wax to form a "sandwich." This lead foil reenforces the wax and will also register the biting of the teeth.



3

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L. N. Bottomley, D.D.S., Orlando, Florida

3. A Number 12 blade in a scalpel handle is curved just enough to use on the labial and lingual surface of anterior teeth.

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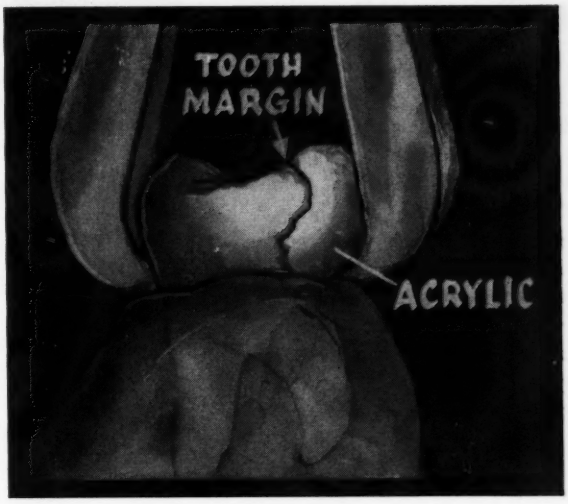
Reenforcement of Tooth Before Extraction

R. W. Pedersen, D.D.S., Boyd, Minnesota

4. A badly broken down tooth is reenforced with quick setting acrylic to allow a better application of the forceps for extraction.

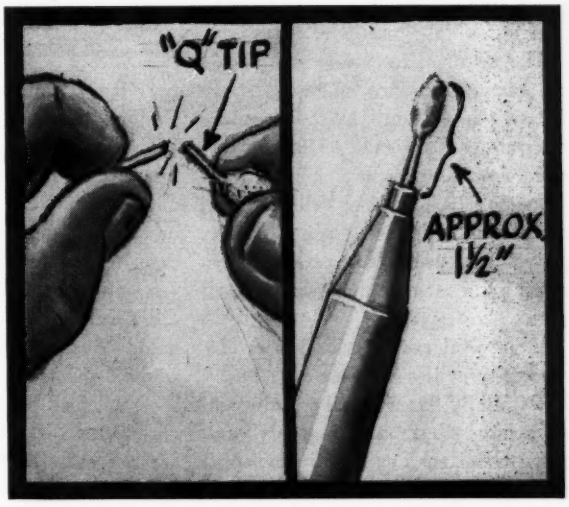


4

A Quick Polisher

John J. Tarsitano, New York

5. Break a Q-Tip and insert a length of 1½ inches in the handpiece or lathe chuck. When used with Tripoli or rouge this makes an excellent polisher for small areas.

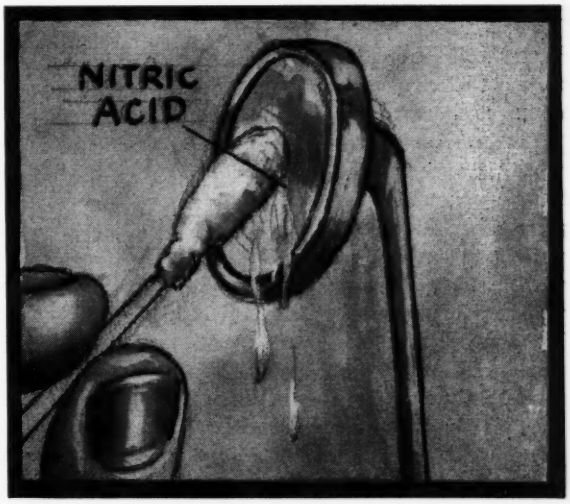


5

Cleaning Water-stained Mirrors

Harold Crandall, D.D.S., Salina, Utah

6. Mouth mirrors become fogged with mineral film after repeated boilings. This film may be removed by the application of concentrated nitric acid followed by thorough rinsing in water. Polishing the mirror-face with tin oxide is another method to remove the film.



6

technique involved; and jot down the advantages of the technique. This shouldn't take ten minutes of your time. Turn to page 130 for a convenient form to use.

Send your ideas to Clinical and Laboratory Suggestions Editor, DENTAL DIGEST, 708 Church Street, Evanston, Illinois.

Periodic Examinations

Medical examination programs carried on by industrial companies can lessen the incidence of death and disability of chronic illnesses. Disease detected during the examination is usually well established, even though the patient does not have symptoms. Transient or early hypertension, however, early diabetes, gouty diathesis, nonspecific electrocardiographic disturbances, and rectal polyps may be recorded.

Employees should be examined annually. Less detailed study semiannually may be advisable to detect early cancer of the lung and prostate and to observe asymptomatic electrocardiographic alterations.

The personal interview and physical examination are much more effective than a multiphasic screening program that depends on laboratory and roentgenographic procedures. Blood count, cholesterol, uric acid and postprandial sugar determination are particularly useful for persons over age 50 and may be done every third year.

If physical examination shows abnormality or if a member of the subject's family has a metabolic disease or achlorhydria, additional laboratory studies, such as blood chemistry, gastric analysis, urine indicator resin, and roentgenographic and stress tests may be included. Proctoscopic study probably should be done each year for employees over 40 years of age. Electrocardiographic examination is the most effective procedure for detecting cardiovascular disease.

The exercise test is positive for about 10 per cent of apparently healthy persons between 45 and 60 years of age. About one fifth of these patients eventually show electrocardiograph evidence of myocardial damage or have coronary thrombosis. Coronary artery disease can be excluded if the ballistocardiogram is normal and the patient does not have signs or symptoms of cardiovascular disease. However, ballisticardiographic tracings of healthy persons over age 50 and overweight patients frequently show deviations.

Cancer is the diagnosis most frequently missed during periodic examinations. When tumor is suspected or detected, the patient generally has definite symptoms that are being investigated. Benign rectal polyps and other warning signs of cancer may be noted during examination. Blood acid-phosphatase determination is recommended if the prostate is enlarged, even if obstructive symptoms are not associated. Tests for achlorhydria increase the cost of the examination but may lead to more frequent detection of asymptomatic gastric cancer.

Franco, S. Charles: *The Eearly Detection of Disease by Periodic Examination, Indus. M.* **25**:251-257 (July) 1956.

MEDICINE and the Biologic Sciences

Tonsillectomy for Adults

In the adult, the problems of tonsillectomy and the management of anesthesia for this operation are greatly simplified when compared to these problems in children. Usually patients are admitted to the hospital on the day preceding the operation. They are given the customary preoperative physical examination and laboratory examination. They are prepared for the operation in the routine manner and thus come to the operating room in optimal physical condition. Premedication is by means of a sedative with a customary addition of a belladonna drug. A barbiturate is particularly useful when the operation is to be done under local anesthesia.

Local anesthesia is the method of choice for most cases of adults undergoing tonsillectomy. General anesthesia is indicated for one reason or another in a few cases. It may be that the operator is unfamiliar with the technique of local anesthesia and that he feels his results would not be adequate to relieve all pain and discomfort in his patient. It may be that the patient himself desires general anesthesia and cannot be persuaded to remain awake during the operation. He may tend to gag or vomit on exposure of, or contact with the fauces. Again, it may be that his history reveals previous reactions connected with the administration of a local anesthetic. Under these circumstances it may be advisable to recommend that the operation be done under general anesthesia.

If general anesthesia is decided upon, it should be clearly realized that this is a regular surgical procedure within the patient's airway. It is presumably going to be a relatively prolonged intervention because of the marked fibrosis of the tonsillar tissue. Blood loss could be relatively significant. Endotracheal intubation is therefore virtually mandatory.

As a rule, hypertrophied adenoid tissue is absent. Nasal intubation is, therefore, advised in most cases in adults as the tube extends from the nasopharynx along the posterior wall of the pharynx, well removed from the operative field. The operation is commonly a relatively long one as compared to tonsillectomy in children.

The postanesthetic management of the adult tonsillectomy patient is not too different from the postoperative management of any patient who has

(*Continued on page* 130)

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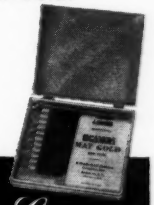

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CLINICAL AND LABORATORY SUGGESTIONS

(*See pages* 126 *and* 127)

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(*Continued from page* 128)

undergone operations within the airway. Close attention must be paid to the possibility of postoperative bleeding. Although the adult is less likely to swallow large amounts of blood without being aware of it (unless extremely heavy sedation has been given), this is to be discouraged. Also the adult will withstand a much greater absolute blood loss than the child. This complication is, therefore, not of the same degree of urgency and importance.

Sadove, Max S., and Wyant, Gordon, M.: Anesthesia for Tonsillectomy, Gen. Practitioner **14**:81-87 (October) 1956.

Injuries in the Aged

Among elderly persons, only cardiovascular disease and cancer cause more deaths than accidents. Most injured oldsters were ambulatory before the mishap. Restoration of activity is essential, therefore, to prevent rapid mental and physical deterioration.

The initial care of accident victims is the same for all ages. It consists of restoration and maintenance of an open airway, control of hemorrhages, shock treatment, and immobilization of fractures, preferably by applying traction for leg injuries.

Morphine should be used only to relieve pain. Danger of permanent brain, heart, and kidney damage when shock and anoxemia persist is greater in old patients than in young persons. Fluids must be given cautiously in order to avoid overloading the right side of the heart and the kidneys.

Required operative procedures, such as for fractures or abdominal injury, should be performed as soon as shock is controlled. If the patient was ambulatory before injury, examination before surgery need be no more thorough than for a young patient.

Attention to psychologic factors is as important as treatment of the injury. The patient should understand

(*Continued on page* 132)

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1. Fitzgerald, G.: Dental Digest 62:494 (Nov.) 1956.

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(*Continued from page* 130)

that except for the disabled portion, which usually mends in time, the body is in as good a condition as before the accident. Relatives should be instructed not to treat the patient as a hopeless invalid.

During convalescence, the patient should be allowed to continue past habits of eating, smoking, and consumption of alcoholic beverages. Every joint not immediately adjacent to the injured part should be exercised every day. Muscles of the shoulders, arm, and unaffected leg must be strengthened by daily exercise if crutch walking is anticipated.

Care must be exercised in treating unconscious people to determine whether the cerebral vascular accident was spontaneous or caused by external trauma. Craniotomy may relieve traumatic extradural and subdural clot. Roentgenographic evidence of a fracture does not prove external trauma as the skull might have been fractured in the fall caused by a stroke.

Persistent edema is more likely to cause joint, tendon, and muscle adhesions in elderly patients than in young persons. Early and persistent elevation is recommended, but if the patient has arteriosclerosis, elevation may lead to anoremia. Phlebitis is a common complication among aged accident victims. Blood viscosity may be due to low fluid intake. The physician and nurses should be alert for redness of the skin to detect impending decubitus ulcers.

Kennedy, Robert H.: Management of Injuries in the Aged, Bull. New York Acad. Med. **32**:487-494 (July) 1956.

Swallowed Foreign Objects

Most foreign objects that children swallow will eventually pass without difficulty. Such items as bobby pins and long straight pins, however, often become lodged at the stomach outlet, the ligament of Treitz, or the first part of the bowel. In such instances, perforation and inflammation may occur.

When a child is suspected of having swallowed an opaque foreign body, the following is done: The parents are asked to furnish a similar object for magnetic testing. The mouth, nose, and throat are searched in the examining room. An abdominal radiogram is made or fluoroscopic examination is done. If nothing is found, films of the chest and neck are made. The lateral neck position is especially important, since material in recesses of the pharynx is easily overlooked. Objects in the esophagus may be removed by forceps or magnet, with esophagoscopic and, occasionally, fluoroscopic aid. If the foreign body is seen in the stomach and is of a type usually passed, the parents are instructed to strain each stool until the object is recovered. If a magnetic object in the stomach appears unlikely to pass, a magnet is introduced through the mouth, manipulated under the fluoroscope until contact is made, then carefully withdrawn. An endoscopist should be ready in case the article is detached and aspirated.

Laff, Herman I., and Allen, R. Parker: Management of Foreign Objects in the Alimentary Tract, J. Pediat. **48**:563-568 (*June*) 1956.

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Hypnosis: From Stage To Clinic

A dentist (A. A. Papermaster of Fargo, North Dakota) teamed with two surgeons of the University of Minnesota (A. S. Leonard and O. H. Wangensteen) to see if an improvement could be made under hypnosis in those unfortunate patients who suffer from the "dumping syndrome" that sometimes follows surgery for duodenal ulcer. This unpleasant syndrome is "characterized by a number of symptoms, including epigastric distress, sweating, palpitation, diarrhea, nausea, anorexia, syncope, weakness, and food dyscrasias."

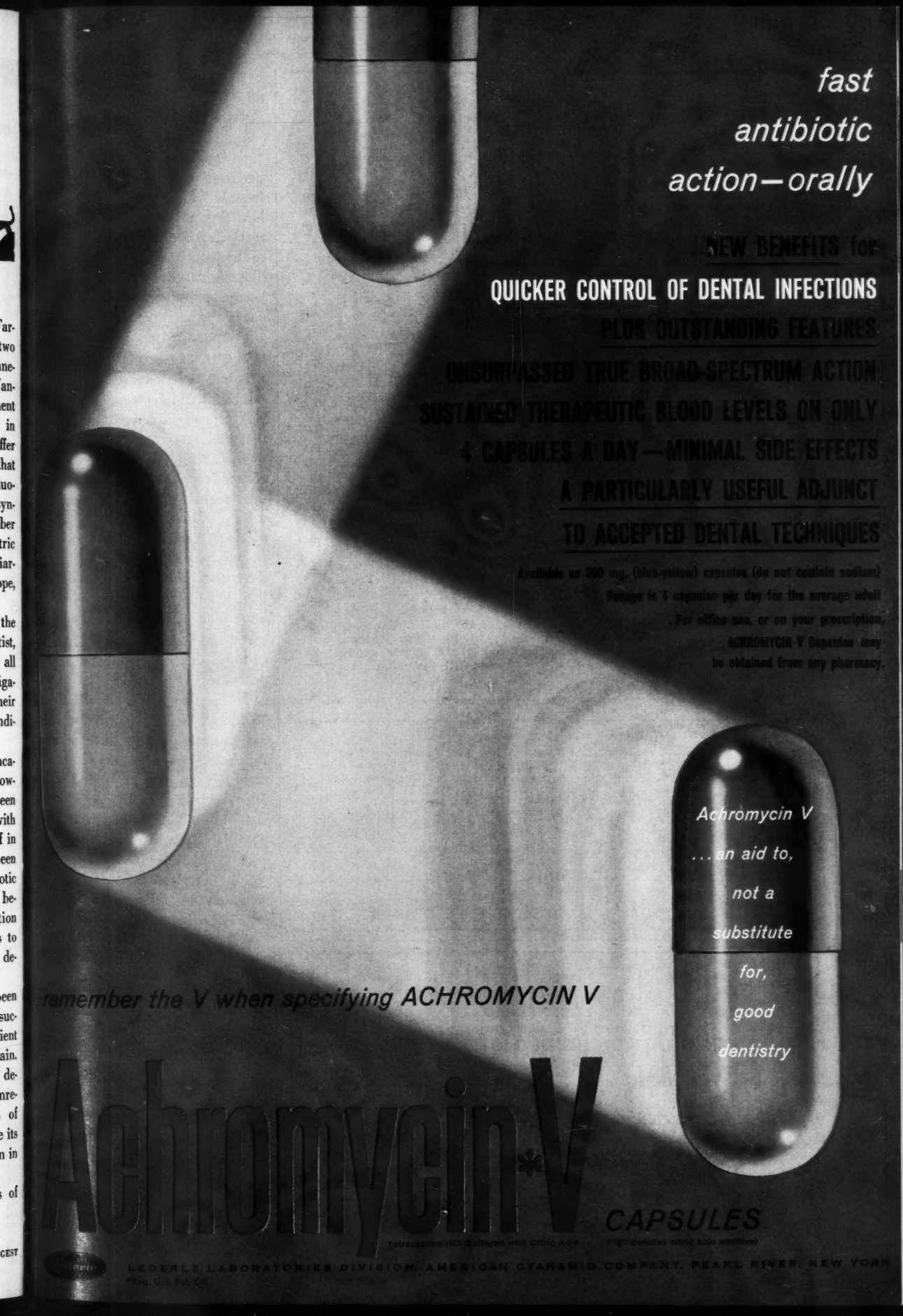
In their series of cases, where the dentist acted in the role of hypnotist, an improvement was observed in all the patients. These three investigators are now planning to extend their treatment to other types of conditions:

"A total of 16 patients with incapacitating dumping syndrome following gastric resection have now been treated by hypnotic suggestion with complete or nearly complete relief in each case. These patients had been subjected individually to hypnotic suggestion on several occasions before the group hypnotic suggestion plan was carried out. It appears to be a very suitable and helpful device.

"Hypnotic suggestion also has been employed recently with complete success in the management of a patient with persistent 'phantom-limb' pain. We are planning to employ this device in bizarre types of pain unresponsive to conventional modes of therapy. We expect also to explore its use in facilitating weight reduction in uncooperative obese patients."

The publication of the results of

(*Continued on page* 136)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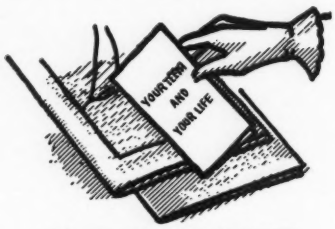

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(*Continued from page* 134)

this study appeared in the *Journal of the American Medical Association*, a journal that is neither "radical" nor "unorthodox." This *Journal* is the steadfast opponent of all things that resemble quackery in any form. The fact that this respected publication recognizes the boundless possibilities in hypnotherapy is a boost to all those dentists and physicians who have taken the phenomena of hypnosis out of the backroom, from the vaudeville stage, and applied the principle to therapy.

It has taken courage for respected professional men to take a second look at psycho-physical phenomena that had for years carried a stigma of the occult. My own residual preconceptions toward hypnosis are deeply buried in my past and I find it hard to break through that barrier of prejudice to accept hypnosis, even when I have seen demonstrations that were convincing and entirely plausible. I am sure that others have this same kind of prejudicial association.

As a newsboy many years ago I saw a man who had been hypnotized on the stage, placed in a deep trance, and deposited in a store window for all to see. There he slept for several days without a sign of awakening. In the Opera House on Saturday night the man was suspended in rigid form with his heels on one chair and his occiput on another. A rock was placed on his chest and broken with a sledge-hammer. His sleep and rigidity survived this procedure and consciousness returned to him only after an order from the hypnotist. From my free seat in the balcony (a sort of a press box) I watched the act with some anxiety. After more than forty years I can still recall the command that brought the awakening: "All right you are!"

Perhaps from a Celtic background, filled with tales of "the little people" and the leprechauns, I was more impressed and awed than were some of my Anglo-Saxon and Teutonic companions. It is hard for me to put aside this impression from youth to accept the biologic and therapeutic

(*Continued on page* 138)

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References: 1. Krantz and Carr: The Pharmacologic Principles of Medical Practice, 1954. 2. Goodman, Louis S. and Gilman, Alfred: The Pharmacological Basis of Therapeutics, sec. ed. 1955. 3. Hammes, E. M., Jr.: Pain-Relieving Drugs, J. Lancet 79:67, Feb. 1952.

(*Continued from page* 136)

facts of hypnosis. But we all labor under clouds of misconceptions, prejudices, and preconceptions of one form or another. One of the hardest disciplines that faces us, and it does constantly, is to break down the wall of "facts" and "fancies" and shift our judgments as newer evidence is presented. That is, indeed, a man's size and lifetime job for all of us.

This idea was remarkably well expressed by Francis A. Cartier (*Medical Science*, 10 December, 1957):

"Our society places such high value on conformity that creativity is discouraged. The stereotype, the habit, the unchanged and unwritten policy, the desire not to stand out from the crowd, the reluctance to communicate in anything but well-worn cliches—all these are limiting forces which prevent us from coping with the state of constant change we live in. This is true in the military, in industry, business, government at all levels, in diplomacy . . .

"If we could take as our motto 'Nothing necessarily has to be the way it is,' for even a few minutes a day, we might break the spell of unimaginative routine."

The dentists and physicians who have had the bravery to risk the scorn and ridicule of their conformist colleagues to examine the phenomena of hypnosis, that had been degraded by the stage performers, are entitled to proper credit. The easy way, the coward's way, is to follow the pack and never reach for the responsibility and the misunderstanding that often comes with leadership. If we accept "authority" without question or inquiry, if we are fearful to speak our thoughts, if we are timid to publish our points of view, we are asking for intellectual dictatorship. We have learned in the last several months that the false image of science and the arrogance of some scientists are frightfully exposed. It is time in every department of affairs to take a closer look at all the people who have set themselves forth as authorities. The rule by ukase, by decree, by parliamentary resolution, by publicity handout may be, and often is, entirely wrong and contrary to *the facts of the present.*

How Much Does it Cost You to Write a Letter?

I am no shakes as an efficiency expert. Although I am a fervent believer in time and motion studies I find myself backtracking and going through whole series of false motions. I write and receive hundreds of letters in a year, some that are real pleasures and others that are less. The cost of this outpouring and incoming of written words has never been a matter of serious study to me; nor, I am sure, has it been to most of the people who write and receive letters.

Because I have never been too expert at figures I am forever impressed with anybody who can carry a figure past the first decimal place. In the higher reaches of fiscality, a billion dollars for example, my imagination is frozen fast.

It was, therefore, with some awe that I read of a study made by the highly respected Dartnell Corporation and reported by the equally respected Remington Rand Corporation, that it costs $1.70 on the average to write a letter. The breakdown on this expense reads:

"Today the cost of writing a typical business letter is $1.70, an increase of 31.2 per cent since a previous nation-wide survey conducted in 1953. The list below shows the cost breakdown of this $1.70 figure.

1.	Dictator's Time—7 minutes per Letter	$0.336
2.	Stenographic Cost—20 letters per Day	.650
3.	Nonproductive Time	.148
4.	Fixed Charges	.394
5.	Materials	.065
6.	Mailing Costs	.035
	Total Cost	$1.70"

Ordinarily dentists are not avid letter writers. They make their living standing at the chair or working in the laboratory. Unlike many business men and professional people, such as lawyers, who make their livelihood sitting at a desk dictating to a secretary or to a machine, the dentist knows that letter writing for him is a

(*Continued on page* 139)

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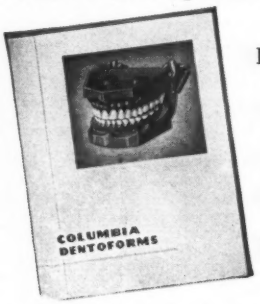

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(*Continued from page* 138)

profitless chore. The dentist cannot improve his business by writing letters of solicitation or by turning out sales literature. This would be a direct violation of the Code of Ethics. Nor are the auxiliary personnel in the dental office (assistants or hygienists) often motivated by the writing impulse. If they were they would have sought other kinds of employment in the first place.

Despite the costs involved none of us writes enough letters. This may be contrary to what an efficiency expert might conclude, but, thanks be, there are other values more important than efficiency: human values. Most of us are so engrossed in our own ego, so concerned with our own little world, that we do not reach out often enough with a cheerful written word to the one in distress or despair or send a little note of good wishes to someone in recognition of some accomplishment. I need not say that the angry note, the letter of indignation, does little good for either the writer or the receiver.

I think now of the beloved C. N. Johnson who lived a busy and productive life but was never too busy to write to a friend in need or to one who had achieved any measure of new fame.

Most people are well endowed with good intentions. We meant to write the little note, but somehow never get around to the task. Then we become swamped in the bog of time.

The $1.70 that we spend to write a letter may be the finest investment that we make in a lifetime!

—E. J. R.

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*Tronathane® in Primary Gingivostomatitis**

Lewis H. Lambert, M.D., and Otis Field Jillson, M.D., Hanover, New Hampshire

Discussion

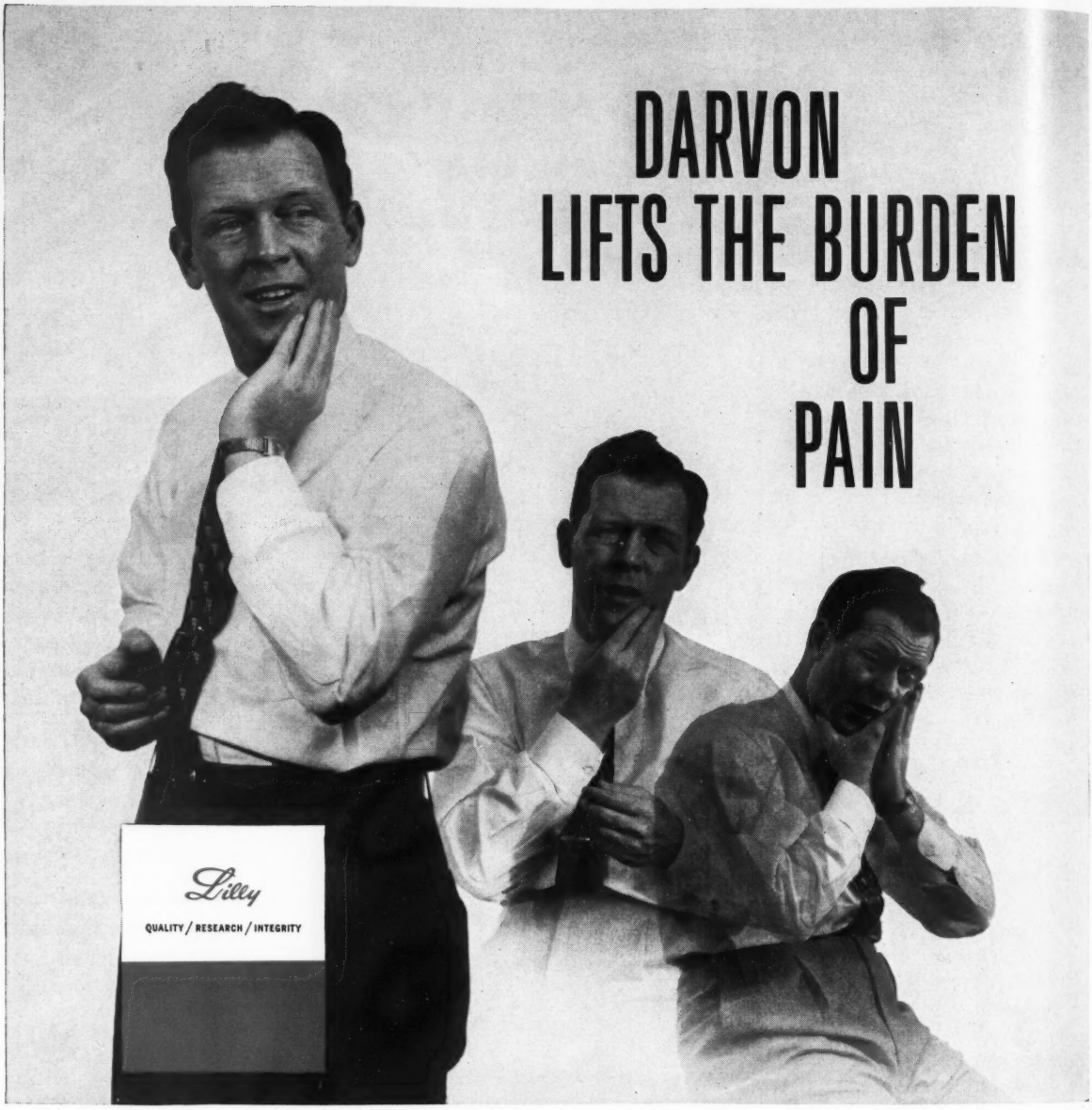
Repeated and indiscriminate use of the "caine" derivatives for symptomatic relief of painful oral lesions has been viewed with reluctance because of the possibility of toxic reactions manifested by (1) tachycardia, (2) muscular twitching, and (3) in severe cases, convulsion and death. Sensitization becomes a problem because, when present, it precludes the further use of these valuable agents.

Anesthesia may be Incomplete—It has been shown that certain "caine" groups produce ineffective anesthesia when applied topically to the mucous membrane.

New Drug Effective—Tronathane®, structurally different from all other topical anesthetics now available, contains an ether linkage and morpholino radical, both of which differentiate it from other local anesthetic agents and thus reduce the likelihood of cross-sensitization.

(*Continued on page* 141)

*From the Department of Anesthesiology and Dermatology, Hitchcock Clinic and Dartmouth Medical School.



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DARVON COMPOUND (Dextro Propoxyphene and Acetylsalicylic Acid Compound, Lilly) further intensifies effectiveness by combining the anti-inflammatory and anti-pyretic benefits of 'A.S.A. Compound'* with the analgesic properties of 'Darvon.' Usual adult dose is 1 or 2 pulvules every six hours as needed.

*'A.S.A. Compound' (Acetylsalicylic Acid and Acetophenetidin Compound, Lilly)

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(*Continued from page* 139)

Toxicity Low—Animal studies and clinical observations have demonstrated that toxicity is extremely low. Primary sensitization appears to be negligible.

Limited Applications Advised—Although this drug appears to have a wide margin of safety, it should at present be prescribed in limited quantity because of its newness and possible indiscriminate use.

Methods of Differentiation

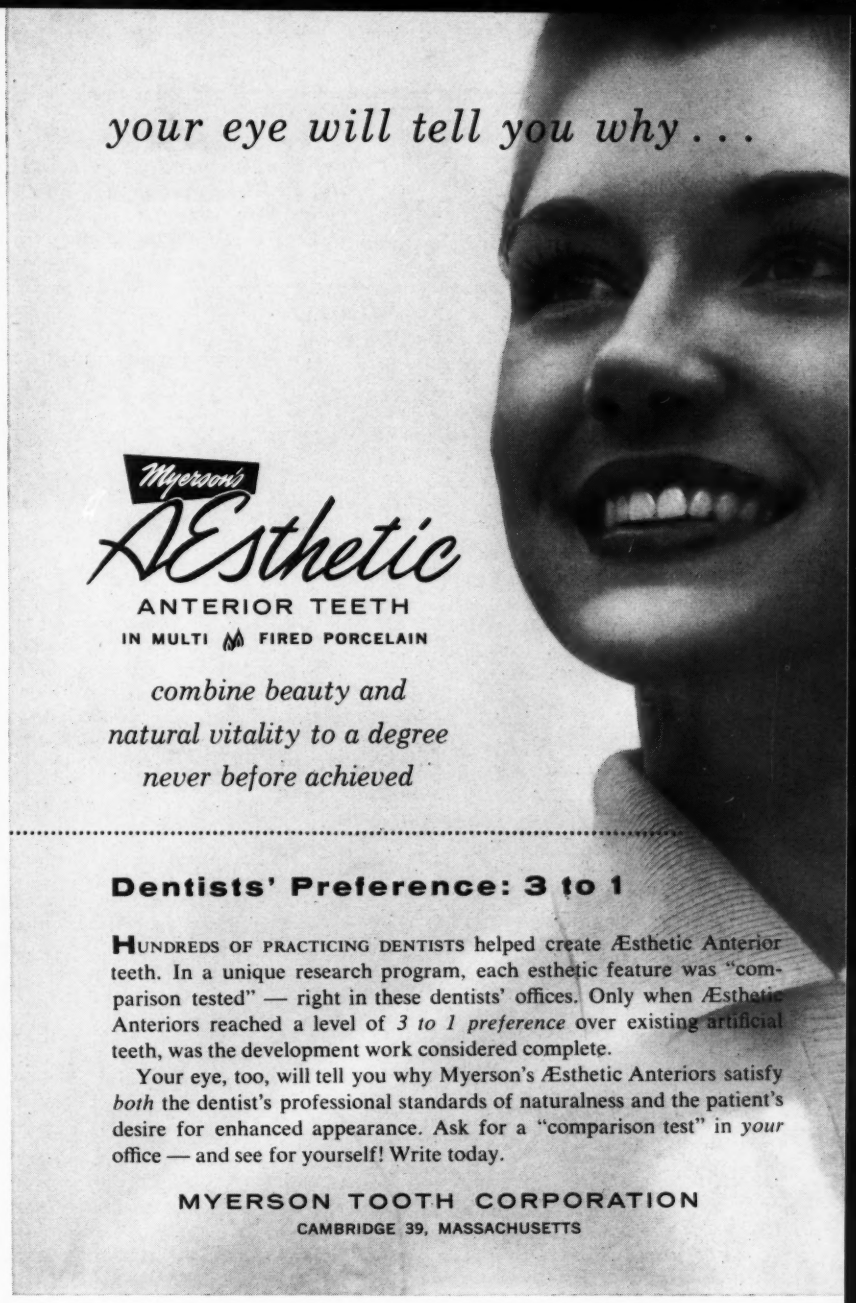
It is relatively easy to differentiate herpangina from primary gingival stomatitis on a clinical basis. In the former the lesions are confined to the tonsilar pillars and soft palate, and the disease occurs only during the summer months.

Herpetic Stomatitis—This condition may occur at any time and produces a more generalized distribution involving the soft tissue, lips, tongue and buccal mucosa. In addition there is gingival hyperemia and hypertrophy which cause the tissue to bleed easily.

Herpangina—The oral lesions of herpangina persist for only four to six days and its course is milder than that of herpetic stomatitis in which the lesions last for eight to fourteen days, with a more dramatic course. It is therefore important to establish a definite diagnosis.

Tzanck Procedure—Diagnosis can be established by means of the Tzanck procedure: Material is scraped from the floor of a lesion, placed on a slide and stained with the Giemasa technique. The presence of epithelial giant cells is found only in three viral diseases, (1) herpes simplex, (2) herpes zoster, and (3) varicella. Clinical manifestations of the herpes-simplex virus, such as the ordinary cold sore and herpetic stomatitis, are easily differentiated from the other two viral diseases.

Disease Highly Contagious—This report agrees with the opinion that in a susceptible population the disease is highly contagious. In addition it would appear that the stomatitis was acquired from an adult with cutaneous herpes simplex.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Summary and Conclusions

In the cases studied Tronathane was an effective and safe anesthetic for the relief of discomfort associated with herpetic stomatitis. The disease is highly contagious and may be acquired from cutaneous herpes simplex. The Tzanck procedure is a simple confirmatory diagnostic method.

Adapted from *New England Journal of Medicine* **254**: 757 (April 19) 1956.

Radiation Exposure

Query

Recently increasing concern has been shown regarding the hazards implied in the use of diagnostic as well as therapeutic x-rays. What is an opinion as to the x-ray dosage to which routine dental films expose the patient in the average office, and what significance, if any, is there to the repetition of these dosages at nearly

(*Continued on page* 142)

Advertisement

Slightly Controversial

The dental profession is perhaps as well "literatured" as any, judging by the fact that one can hardly keep up with all the journals. So if you haven't seen this one, we would like to bring it to your attention. Quoting from the A.D.A. JOURNAL, May 1957, Phillips and Swartz state (and they should know) "The silicate restoration is, of course, *quite soluble in oral fluids*, particularly the weak organic acids that may be present in a protected region." This hardly needs to be brought to our attention, as we have all observed this time and again.

The fact remains that *silicate restorations wash out.*

Another fact also stands out. PEARLon is not soluble in oral fluids and is even *insoluble in concentrated boiling hydrochloric acid.*

This one fact alone should encourage all dentists to *use PEARLon.*

But there are *many other plus factors.* Let us give you another quote from the J.A.D.A., May 1956, Perreault, Massler and Schour state

"Such agents as orthophosphoric acid (filling porcelain liquid) were designated, therefore, as producing a severe reaction and were *considered to be injurious to the pulp* . . . etc."

***By contrast* they go on to say**

". . . acrylic monomer (PEARLon liquid) showed only a very mild effect on the odontoblasts. *No effects were observed in shallow or medium cavities.*"

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Frequent drying out bleaches a silicate. A PEARLon filling is unaffected. *PEARLon is color stable under all conditions,* and passes A.D.A. specs for this factor.

PEARLon is many times *stronger and more wear resistant than silicates.* Can you build up a corner with your silicate? You can with PEARLon.

If the above doesn't send you, try this. Grind a spot on a freshly extracted tooth. Place a PEARLon filling ON it (no undercuts). After the PEARLon is hard, do this. (1) Boil it for awhile. (2) Freeze it in an ice cube overnight. (3) Allow it to dry out and then wet it time and again. Repeat the above as many times as you wish.

After all this, examine it for color. There will be no change! Try to remove it (remember it is On the tooth, not in it with undercuts). You will not be able to dislodge it.

NOTE: Try this with a silicate. It will drop off the tooth before you can even start the tests. Now do we convince you?

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every subsequent visit to the dentist (ordinarily recommended to be twice a year) over the average lifetime? Also, are there any figures as to the ratio, in these exposures, between the dose received by the head and neck and the dose received by the gonads in the two sexes? Would the latter dose be considered significant from a genetic standpoint?

Discussion

The amount of radiation received by the patient during a routine dental roentgenographic examination depends on a number of factors: (1) the type of equipment, (2) the speed of the film, (3) the technique employed, and (4) for certain considerations, the physical size of the patient determine the amount of radiation necessary to obtain a satisfactory roentgenogram.

Radiation Varies—Depending on these variable factors, the radiation may vary from the high figure of 315 r per 70 seconds for full-mouth examination to as low as 0.24 r per two-second exposure.

Reduction of Dose Obtained—A reduction to one-thirtieth of the unfiltered dose was attained by interposing 0.375 millimeters of copper and 0.5 millimeters of aluminum in the primary beam of the conventional dental x-ray machine without affecting the excellence of the roentgenograms. Such use of proper filtration and other means of dose reduction are rapidly becoming standard practice in dental radiography.

Radiation Significant from Genetic Standpoint—A conventional roentgenographic examination consists of 14 films. The exposure to the gonads of the patient who receives one such examination annually from age 10 to age 30 would be approximately 0.3 r for the male and about 0.05 r for the female. The natural background radiation to which everyone is exposed is about 4 to 5 r for a 30-year period. All radiation is significant from a genetic standpoint. The amount of gonadal radiography received incidental to dental radiography is but a fraction of the natural background radiation, however, and would appear to be relatively insignificant.

Adapted from Queries and Minor Notes, *Journal of the American Medical Association* **165**:639 (Oct. 5) 1957.

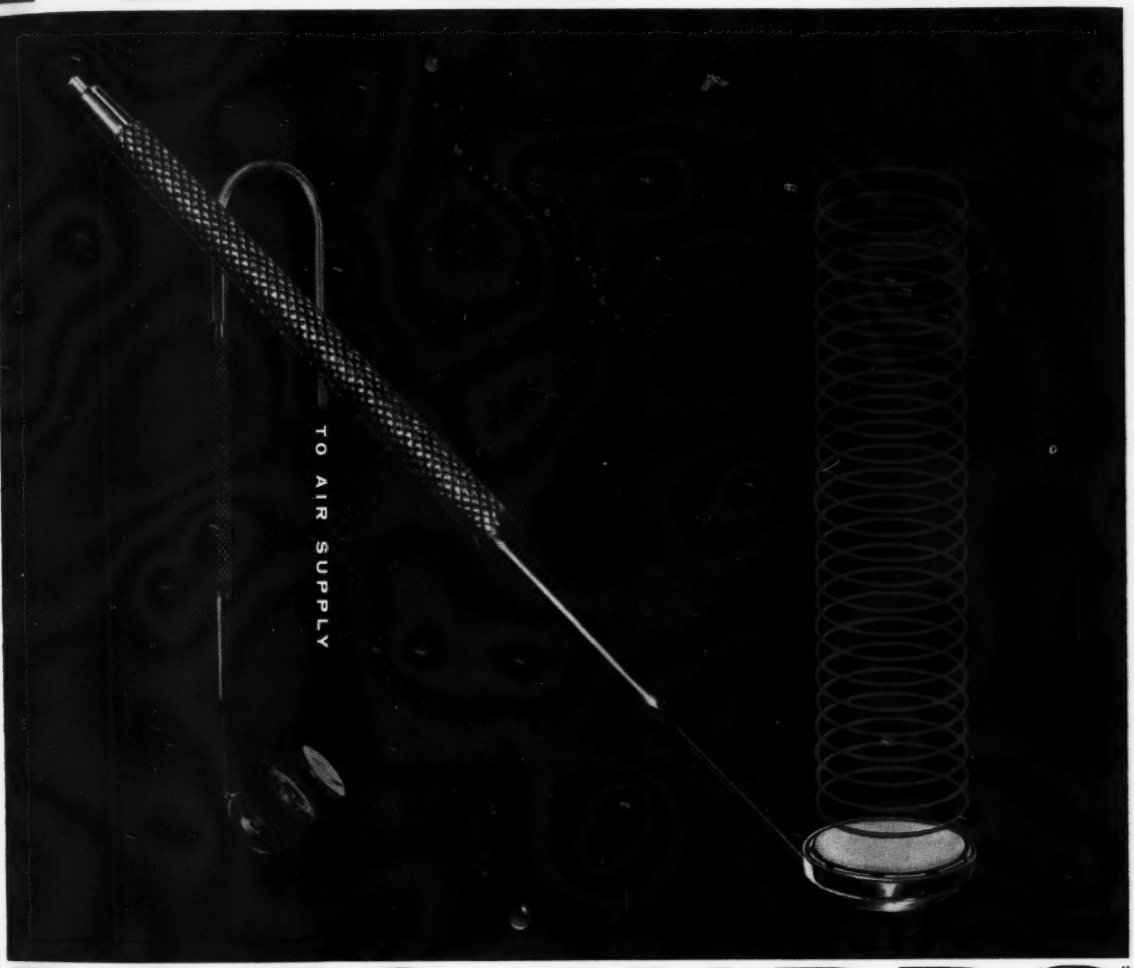
Importance of Vitamin C in the Diet

Sources of Vitamin C

The Council on Foods and Nutrition recognizes the importance of dependable dietary sources of vitamin C (ascorbic acid), the vitamin necessary for the prevention of scurvy. Vitamin C is important for the preservation of the normal health structure of the gums and soft tissues of the body and for the development of teeth and bones. It must be supplied by the diet because the human body cannot synthesize vitamin C, as can some animals. The value of citrus fruit and tomatoes as sources of vitamin C is well known. Other foods that aid in maintaining normal daily intakes of vitamin C are potatoes, various vegetables, especially greens, raw cabbage, and green peppers—berries, other fruits, and melons.

(*Continued on page* 145)

NEW



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The ROTO-MIRRO* is fashioned in stainless steel with an automatic valve which turns off its air supply when not in use. Special adapter kits are available for all water coolant units. Ask your dealer about the new ROTO-MIRRO* now! (*If he is temporarily out of stock, have him write us.*)

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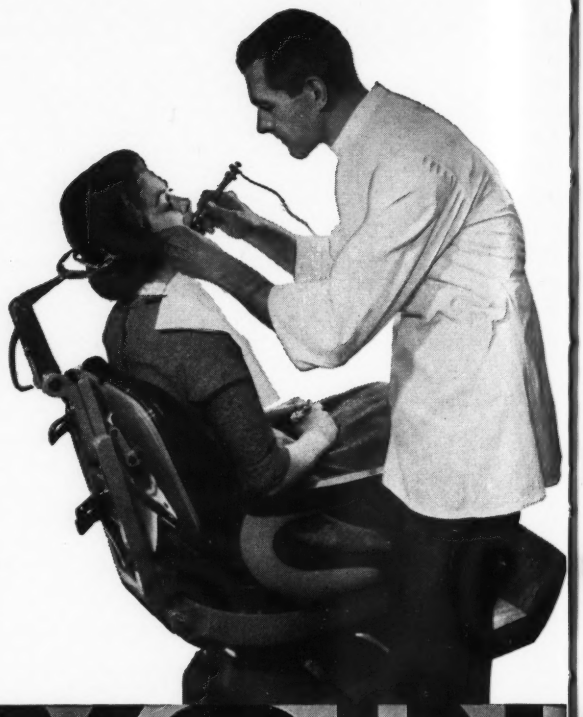

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for faster and higher
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Adapted from Report of the Council on Foods and Nutrition, *Journal of the American Medical Association* **160**:1470 (April 28) 1956.

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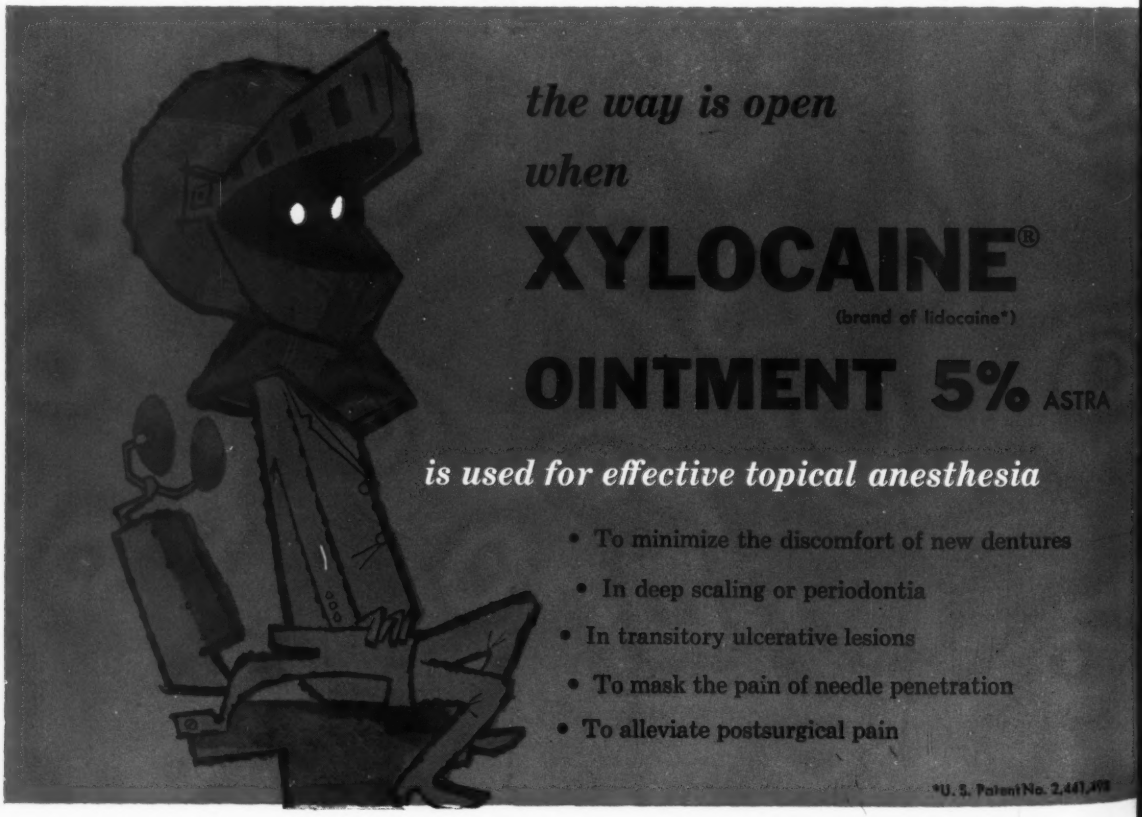
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